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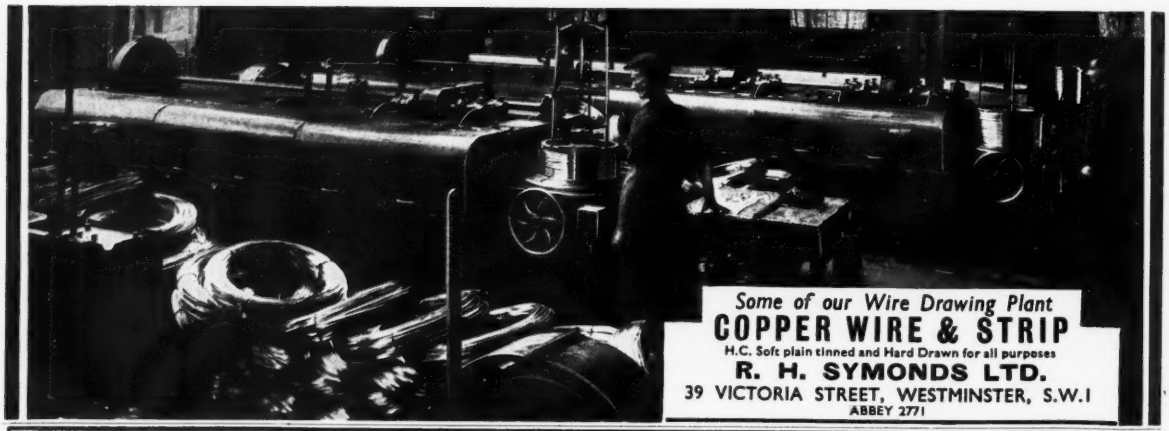
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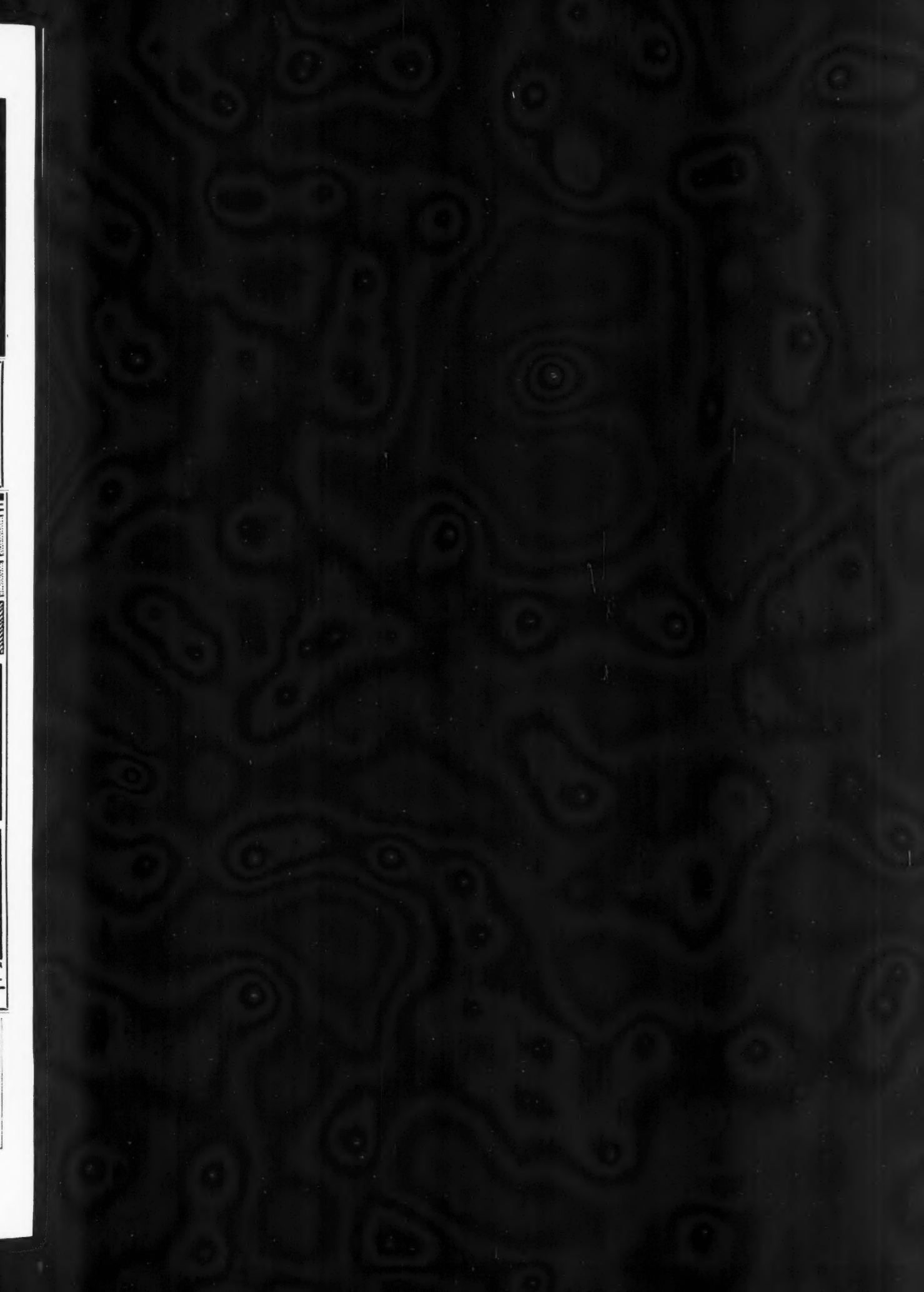

THE
ELECTRICAL REVIEW

Volume CXXVIII — No. 3314

Friday, May 30, 1941

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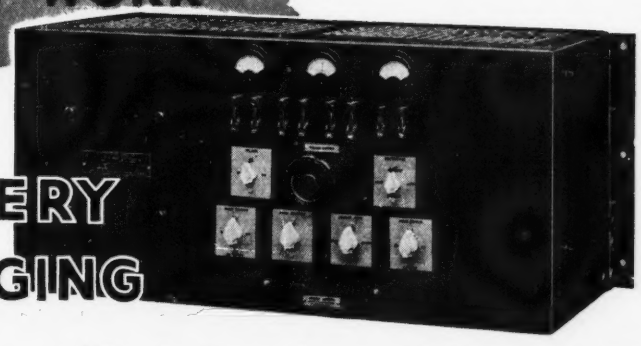

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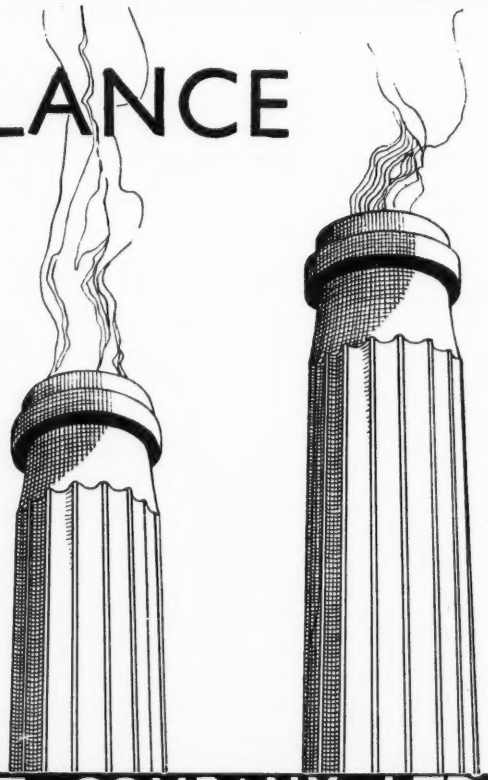

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THE
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THE OLDEST ELECTRICAL PAPER —— ESTABLISHED 1872

Vol. CXXVIII. No. 3314 MAY 30, 1941 Price SIXPENCE

Coal, Rationing and Consultation

Minister's Views on Select Committee's Report

A NUMBER of interesting reports have been issued by the Select Committee on National Expenditure and we have often wondered what action has been taken by the Departments concerned upon the recommendations made by the Committee. The Twelfth Report for the 1940–41 Session throws some light on the matter.

The Report in which we were particularly interested was the Ninth of Session 1939–40 which dealt with several subjects concerning the electricity supply industry. The shortage of coal in the preceding winter led the Committee to suggest the laying-in of adequate stocks during the summer months, particularly at power stations, and it was considered that the Central Electricity Board should be empowered to specify the stocks which should be held by electricity supply authorities.

In reply to this the Minister of Transport stated that he fully appreciated the importance of the matter, and he was advised that he had power under Regulation 56 of the Defence (General) Regulations, 1939, to give directions to electricity undertakings as to the stocks of coal to be held by them. He had been informed by the Electricity Commissioners, however, that from the information obtained by them there were no cases in which directions appeared to be called for. He would not hesitate to take immediate action if it became necessary to do so.

Electrical Industry Ignored

It will be recalled that when the proposals for the rationing of electricity were published we complained that it appeared that the electricity supply industry had not been consulted in the matter. The Ninth Report bore out this contention, for the Committee stated that it was informed that there had been "insufficient consultation between the Mines Department and the electrical industry in general." It recommended that the Central Electricity Board should be consulted by the Mines Department before any further scheme for rationing electricity was introduced.

The Minister agreed with this recommendation, but pointed out that the Central Board was only concerned indirectly; the problem was one of distribution rather than generation. It was even more important that there should be consultation with local distribution authorities, and the Electricity Commissioners were in touch with these through a Joint Committee representative of all the electricity supply associations.

The best results would, therefore, be obtained by the Mines Department consulting, through the Electricity Commissioners, with both the Central Board and the Joint Committee, and the existing arrangements had been modified accordingly. Incidentally, the Mines Department recently announced that it would soon cease to be concerned with electricity rationing, but the modified arrangements will, no doubt, apply to whichever Department is concerned.

The Minister also stated that electricity undertakings had now been relieved of their statutory obligation to maintain supplies when they had suffered war damage. This would enable them, in restoring supplies, to give priority to establishments engaged in war work. The Commissioners were also in consultation with representative associations as to the best method of securing voluntary rationing by domestic consumers at peak load periods.

Power for War Factories

The Committee was "disturbed to discover that Ministries as a whole seem to attach very little importance to the necessity for closer contact with the electrical industry." It was told by Central Board witnesses that "until recent weeks it was apparently not the responsibility of any Government Department to ensure that new Government factories (or extensions of existing factories) should be so located that electric power from public sources was, or could readily be made, available." As a result sites had been acquired before the Departments concerned had satisfied themselves that the necessary power was to be had, with consequently increased expenditure. It was, accordingly, recommended that the Central Board should be consulted on all questions relating to the supply of power to Government factories and that a small technical advisory committee should be set up to advise the Board.

The Minister agreed that there had been a lack of co-ordination on account of the setting-up of new Departments and branches and of the rapid expansion of war demand. But when this became apparent the Electricity Commissioners recommended such a committee as that proposed and it had been set up in April last year. It was convened as and when necessary by

the Commissioners and had been successful in securing the early notification of power requirements to the Commissioners and the Central Board.

As to the general question of advice to the Central Board, the Minister pointed out that there were already the National and Area Advisory Committees set up under the 1926 Electricity (Supply) Act, so that it was hardly necessary to appoint a further technical advisory committee.

It will thus be seen that where the Select Committee's recommendations had not been anticipated some attention is being paid to them. It is a pity, however, that we have had to wait so long for a report of the results ; the Minister's remarks are dated September, 1940.

Preserving Goodwill

SOMEBODY (was it Emerson ?) once made a profound remark about the way prospective purchasers rushed to seek out the maker of a better mouse-trap, though he lived in the heart of a forest. Things are not so easy for the producers of goods in this competitive age; only by their own efforts and adequate publicity can they make themselves heard in the market place. Once they drop advertising they find it very hard to get their names into buyers' minds again. That is why the President of the Board of Trade has promised that firms who are submerged under the Government's schemes for the concentration of industry shall be assisted in preserving their names and goodwill. This can only mean that they will be able to continue to advertise, but there are other concerns whose need is as great—we refer to those who are now exclusively engaged on Government work. Yet we learn from the *Advertiser's Weekly* that some of these concerns have been forbidden to advertise their normal products on the ground, apparently, that they will thereby raise their costs of production. This is likely to prove a serious matter for them and should be reconsidered by the authorities.

Replacement of Tools

WE were asked recently by a firm of electrical contractors whether they could claim compensation on behalf of their men whose tools had been destroyed by enemy action. The matter was taken up with the Board of Trade, which has now informed us that this is a matter which comes within the scope of the Assistance Board and has sent us a copy of Leaflet W.D.3 which shows that compensation may be given " to replace tools which are vital to the continued exercise of the owner's employment." Ordinarily no payment will be made unless the loss or damage exceeds £1 in value. Incidentally, assistance may be given towards the replacement of the uninsured stocks of small retailers. We think that this information may be of general interest.

Household Motors

ONCE upon a time motors were installed only for industrial service, or commercial convenience, whereas nowadays almost any household that is at all electrified will contain several small motor-driven machines which are required to start and stop with varying intermittency. If they could be started without drawing from the supply mains any more current than is needed to keep them going distribution engineers would not fear the connection of motors any more than the best-behaved of other household appliances. As things are, however, the growing number of frequently started motors is causing what the *Electrical World* describes as an ominous number of voltage-dip disturbances every time they are set in motion. Suppliers of electricity in America are said to be awakening to the burden of excess distribution investment necessitated by further increase of the proportion of load represented by motors. Users have to pay for service rendered ; those who select their motors appropriately find themselves better off in the long run, but the remedy is not the simple one of education. Factory managers often have to divide their attention between the driven and driving machines, whereas householders interested in suction cleaning, for example, cannot be expected to concern themselves with the technicalities of the vacuum-creating motor. What will be the outcome of negotiations now proceeding in the United States ? Electricity suppliers in that country have welcomed the suggestion of manufacturers that the old industrial standard in respect of starting current shall be revised.

A Pool for Electricity Undertakings?

ALTHOUGH increases in electricity charges are now usually the order of the day, one occasionally hears of a case where it has actually been found possible to reduce charges, due to the fact that the undertaking concerned has benefited from the war by being in a reception area in which the domestic consumption has greatly increased. That in these days any undertakings should be in such a happy financial position as to be able even to contemplate passing on their good fortune to their consumers is a matter for congratulation. In effect such undertakings are profiting by the ill-fortune of those in evacuation areas, many of which have to face very heavy deficits. It seems to us that it would be only equitable to institute a scheme for pooling results. The position appears likely to become even more emphasised as time goes on, and urgent consideration of the matter is imperative if unfortunately situated undertakings are not to be further penalised.

Power Engineers' Holidays

LAST year the Electrical Power Engineers' Association agreed to the curtailment of power station staffs' holidays and, according to the *Electrical Power Engineer* for April, some electricity supply authorities are assuming that the same arrangements will apply this year too. It is pointed out, however, that this is not the case and that the Association expects its members to be given their usual leave of absence according to the terms of the National Joint Board Schedule. If undertakings are desirous of reducing holidays, it is necessary for them to raise the matter at meetings of the District or National Joint Boards, but it is stated that there appears to be no justification for this as power engineers have had a very trying winter and fully deserve the holidays to which their agreement with their employers entitles them.

Smaller Hydrogen-Cooled units

IT appears to have been the general view in this country that the additional capital expenditure incurred on cooling alternators by hydrogen was not justified for capacities below about 40,000 kVA. Recent progress in the United States, however, has resulted in the putting into commission of hydrogen-cooled units of 20,000 kVA and consideration is being given to the adoption of the system for even lower ratings. No doubt 40,000 kVA has been suggested because the outstanding merit of greatly reduced windage loss in hydrogen makes quite feasible the construction of two-pole machines for outputs much above that figure. Other advantages, such as improved efficiency and saving in active material, have presumably been found enough to outweigh the cost of the hydrogen-cooling equipment for the smaller capacities also. Moreover, the gain in efficiency at 3,600 RPM, the speed of a two-pole alternator at the United States prevalent frequency of 60 cycles, is more than it is at 3,000 RPM, the corresponding figure for the 50 cycles standard of Great Britain.

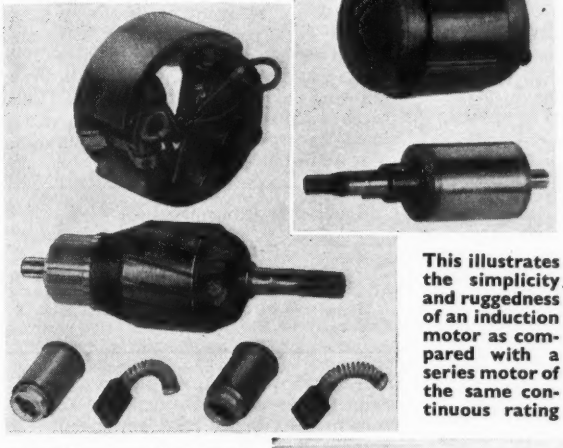
Portable Tool Drives

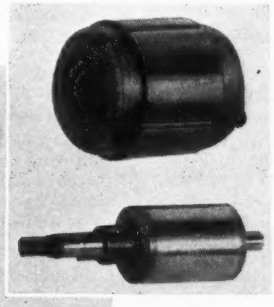
Advantages of the High-frequency Motor

By F. E. Butcher, A.I.E.E.

THERE are four principal types of portable tools—pneumatic, universal electric, high-frequency electric and flexible shaft. The last-named will not be considered here as its applications are limited. For heavy percussive work, such as road-breaking, the pneumatic hammer or drill has no serious competitor, although several electric hammers are marketed that are successful in lighter work such as drilling or chasing in brickwork and similar materials.

The first portable tools made were fitted with air motors, but it was not long before electric motors began to be used, and the types naturally tried were the induction motor and shunt- or compound-wound DC machine. These gave good results, but the power - weight ratio was bad and limited by the maximum speed available at standard frequencies. The variety of DC and AC supply frequencies then existing put the dual motor at a disadvantage, so new developments were looked for.

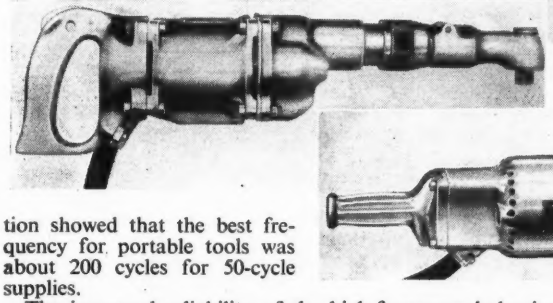


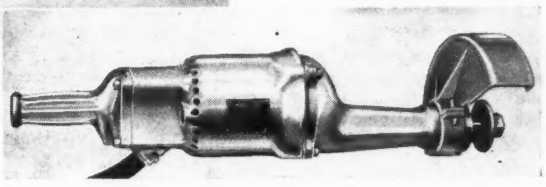


This illustrates the simplicity and ruggedness of an induction motor as compared with a series motor of the same continuous rating

It is claimed that the short step between the series-wound DC motor and the high-speed universal motor was discovered by portable tool engineers, and the adoption of the latter type reduced the motor weight by about 66 per cent. Tools of this type were, and still are, very reliable, but when used in large quantities, the large majority of such stoppages as occurred were due to failure of the armature or wear of brushes.

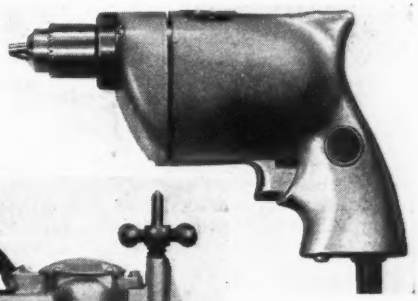
The obvious answer was a reversion to the induction motor. At that time the woodworking industry had been fairly successful with 300-cycle motors running at 18,000 RPM. Investigation showed that the best frequency for portable tools was about 200 cycles for 50-cycle supplies.

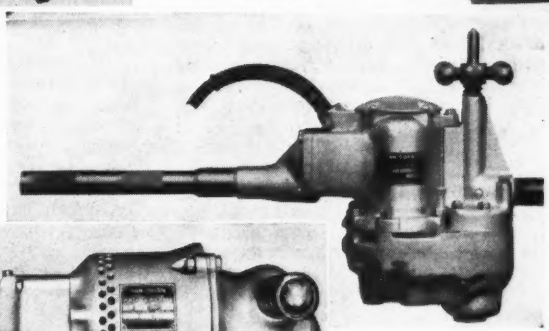


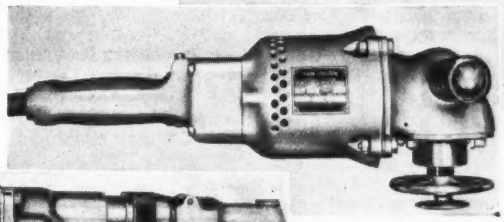


The improved reliability of the high-frequency induction motor was also attended by a further improvement in the power-weight ratio. Motors now in use have active material ratios of 3.5 lb. per HP for continuous rating and 1.8 lb. for maximum rating, as compared with 11.0 and 8.0 (gear losses included in both cases) for universal motors of good design. In some special machines these figures have been considerably improved upon. The constant-speed characteristic of the high-frequency machine is also of the greatest advantage in drilling, reaming, grinding, sanding and other operations, as output can be maintained at full speed. Also the actual grinding speed can be kept close to the safe speed of the stone, which in turn allows more metal to be removed per lb. of wheel wear. The instability of the induction motor beyond its pull-out point is a helpful feature, which generally speaking, prevents excessive overload being maintained indefinitely.

On account of its good power-weight ratio, constant-speed characteristics, reliability and general efficiency the future of the 200-cycle induction motor is assured







Typical high-frequency tools: From top to bottom: Drill; reamer; polisher; screwdriver with right-angle adjustment; and grinder

Long experience shows that it becomes worth while installing high-frequency tools in place of the universal type where five or more machines are in fairly constant use. It is economical to install these machines in place of pneumatic tools in all cases outside the limitations previously mentioned. The high-frequency wiring is little, if any, more expensive than the equivalent wiring for a 50-cycle universal-tool layout, and follows standard three-phase 50-cycle practice, the frequency of 200 cycles not being high enough to cause noticeable inductance or capacity effects.

Fuse protection against overloading of the tools is not practicable, owing to the peaky nature of the load. The fuse sizes should, therefore, be arranged to protect not the tools but the wiring in accordance with I.E.E. Regulation

704C. In a plant using a small number of large tools the wiring should be very liberally rated. Where a large number of small tools are used, the peaks average themselves out sufficiently to be ignored from a fusing point of view. It is usual to let the tools take their chance against overloading, but in the very rare cases where individual protection is required, thermal type cut-outs are necessary. There is a need for a thermal-delay fuse that can be inserted in place of the ordinary cartridge fuse, such as is used in America.

It is advisable to use a type of plug and socket that can be locked or clamped in position, because, whatever length of cable is fitted to the tools, there comes a time when just a few inches more are required, and the operator stretches the cable as much as possible. Under these conditions the plug becomes partly withdrawn from the ordinary socket, one line perhaps becoming open-circuited so that when next the tool is switched on it will not start on the remaining two lines. The chances are that as the tool is not actually rotating, it is left switched on while the electrician is sent for, and the stator burns out. This condition, which can also be caused by the cable being caught in a truck or a man's foot, is one of the most frequent causes of failure.

Some factories or departments contain few or no heavy machines, but consist of large areas wired solely for the use of portable electric tools, and experiments have been made on the Continent in such cases with the whole of the lighting load connected to the 200-cycle circuits. This resulted in a very much simplified layout, but German occupation occurred before really conclusive results could be tabulated.

If filament lighting is used, there should be no ill-effects, but the effect on discharge lighting is less certain at present.

Standard Voltages

The problem of unified electrical servicing arrangements throughout the world was soon overcome by fixing the standard voltages at 110 and 220 for 180 cycles or 125 and 250 for 200 cycles. As a 110-V 180-cycle motor will operate quite satisfactorily on a 125-V 200-cycle supply and vice versa, the parts of both are interchangeable. The same applies to the 220-250-V, 180-200 cycle group. The world was divided into two broad groups, the Americas and Australasia using 220-250 V and Europe using mainly 110-125 V with occasional 42- and 250-V installations. Asia, as yet, is in a state of flux in this respect.

It would be to everybody's advantage if new users in this country confined themselves to the 125-V 200-cycle system, so as to maintain this early standardisation and avoid the trouble that occurred with supply undertakings, which cost so much time, effort and money to overcome when standardisation was decided upon. The toolmakers themselves have worked together well on these standards and in a spirit that should prevail in other branches of the electrical industry.

Some of the older-fashioned engineers maintain that they still stick to air tools because of the absence of shock risk. With the recent development of suitable earth-protection schemes, this risk is almost completely removed. In any case, the voltage to earth is only 72, and therefore the use of 42 V as specified on the Continent for certain situations is not, in my opinion, justified.

With the main causes of electrical breakdown removed, maintenance is confined almost entirely to wear of bearings and gears. Most pneumatic tools (all the medium and large ones) have rubbing surfaces such as pistons or vanes in cylinders, and whilst they continue to operate when a good deal of wear has taken place, extra air is consumed due to the clearances which develop. The electric motor maintains its efficiency throughout its life. Bearing wear is common to both types of tool.

Compressed Air Losses

The average compressed air plant, including tank and pipe work, develops leaks, which represent a serious loss. A hole of $\frac{1}{16}$ in. diameter loses air at 90 lb. per sq. in. at a rate of 6 cu. ft. per min.—a non-stop dead loss of a penny per hour for every leak of this size (with electricity at 1d. per kWh). Leakages of this magnitude are not usually possible in an electrical plant.

A very simple test of comparative efficiencies is as follows: At any time when the plant is shut down and no machines are working, watch how long it takes for the pressure to drop, say from 100 to 80 lb. per sq. in. Suppose this time is five minutes; estimate or measure the kWh consumed to restore the pressure to 100 lb. per sq. in. Suppose the compressor absorbs 15 kW and the time taken to restore the pressure is one or two minutes. This means that every five minutes of the day 15 to 30 kW-minutes have been literally thrown away, a rate of loss of 3 kW or 6 kW on a 15-kW plant, in addition to the no-load losses of the compressor set. I do not suggest that these figures apply exactly to all plants, but I know that many engineers would be surprised at test results.

Results of independent surveys indicate that the operating cost of high-frequency electric tools is very much lower than air tools, the ratio being about 5:1, and in many cases even this is an understatement. The cost of a motor-driven compressor plant is also very much higher than the equivalent frequency changer and switchgear, and requires more maintenance and floor space.

A Pneumatic—High Frequency Comparison

In the following example of a hundred $\frac{3}{16}$ in. drills, pneumatic tools are treated in their fairest light, and no allowance is made for increased air consumption due to wear:—

Pneumatic: Air consumption, 6 cu. ft. per min.=600 cu. ft. for 100 tools; HP required=120 which at 90 per cent. motor efficiency is 99 kW, representing 0.99d. per tool per hour at 1d. per kWh.

High-frequency: Electricity consumption, 180 watts=18 kW for 100 tools; allowing a frequency-changer efficiency of 75 per cent. 24.7 kW is required which at 1d. per kWh represents 0.247d. per tool per hour.

The level speed characteristic is shown to advantage in the following independent tests taken in Holland. Two similar pieces of stainless steel were weighed before and after grinding, timed by stop-watch for five minutes, air consumption measured by flowmeter.

Tool	Wheel	Free Speed	Metal Removed	Power Consumed	Wheel Wear
Pneumatic	6 in.	7,000 RPM	450 grammes	50 cu. ft. per min.	10 grammes
High-frequency	6 in.	6,000 RPM	984 grammes	1,500 W	14 grammes

In the above, 50 cu. ft. per min. =10 HP=8.85 kW from mains (85 per cent. efficiency); 1,500 watts=2 HP=2.14 kW from mains (70 per cent. efficiency). Metal removed per gramme of wheel wear: pneumatic 45 grammes; high frequency 70.3 grammes.

In another case a manufacturing concern, which was drilling holes in thick steel plate in 15 min. with pneumatic tools, the holes being about $1\frac{1}{2}$ in. in diameter and the plate about $1\frac{3}{4}$ in. thick, decided to test two makes of high-frequency tools. One make was about 10 per cent. slower than the other, taking 11 minutes against 10 minutes. I went to investigate and found that a misconnection of the equipment was spoiling the performance of the high-frequency tools. This was put right, and several holes were drilled in 23 sec. each. The time would have been even shorter if I could have turned the feed screw handle faster.

Frequency Changers

My last point is the size of the frequency changers. Their capacity need not be equal to that of all the tools available. The portable-tool manufacturers will give advice as to the machines required, but a rough method is given here. Experience has shown that all the tools are not in use at full load all the time, the proportion varying between 20 and 60 per cent. (load factor), depending on whether the tools are screwdrivers or grinders. Ten grinders, each rated at 1,000 W, would require a frequency-changer capacity of 6 kW while ten screwdrivers or nut-runners, each rated at 1,000 W would require a capacity of 2 kW. This allows a small margin, and the overload capacity of the set has to be considered with the peak loads likely to arise. For large plants, the latter is taken care of automatically, but with very small plants, a margin of 100 per cent. is advisable.

Modern frequency-changers are very compact, a 10-kW machine occupying a space of only 32 by 21 by 19 in. Later on we may see developments with static methods of frequency changing, but these have not yet reached a practical stage.

Acknowledgments are due to Black & Decker, Ltd., for permission to publish data and photographs.

Trade with Argentina

Present Conditions and Possibilities

By a South American Correspondent

THE phenomenal commercial development of South America has taken place principally over the past sixty years or so, so that the River Plate basin is now commercially the most highly developed and richest area and is one of the chief granaries of the world. This development has been due in large part to the pioneer efforts of British engineers, merchants and financiers. On the basis of securities quoted on the London Stock Exchange alone, the total of British capital invested in Argentina is as much as £417,000,000, of which £260,000,000 is represented by the various British-owned railway systems which have contributed so largely to Argentina's agricultural and pastoral development.

Assisted, moreover, by many years of close friendship, Anglo-Argentine trade has been of a uniquely reciprocal nature, Britain being in normal times the chief market for Argentine grain, meat, etc., in return for which Britain has shipped coal and manufactures to Argentina, becoming the leading supplier to the Argentine market.

In our Export Issue of April 25th, our correspondent made a general survey of Latin American markets. Factors affecting our trade relations with Argentina are now particularly reviewed

In the introductory article to this series (ELECTRICAL REVIEW, April 25th) the adverse effect of the loss of European markets upon South American export trade was comprehensively reviewed. Statistics were also given showing the virtual elimination of Germany from the South American import markets, and demonstrating that, despite wartime difficulties, British goods in 1940 continued to represent about 20 per cent. of Argentina's total imports, although outstripped by American goods (about 29 per cent.). Latest statistics show that, during the first two months of 1941, compared with the like period of 1940, U.S.A. products fell to 23.6 from 27.1 per cent. of total Argentine imports; British products to 18.7 from 20.9 per cent.; but the outstanding feature was the jump in imports from Brazil to 13.7 from 4.3 per cent., thereby illustrating the increased competition in South American markets from the Brazilian manufacturing industries.

Indeed, the two main developments observable in Argentina—as elsewhere in South America—as a result of the European war are, first, a decided increase in inter-American trade and, secondly, a powerful impetus to local manufacturing industries. So far as concerns British exports to Argentina, however, it is satisfactory that these are exempt from the recent Board of Trade Order requiring export permits to certain South American markets, whilst, once an import permit has been obtained, exchange cover is forthcoming to pay for British goods. Moreover, under the recent Anglo-Argentine Payments Arrangement, the rate is fixed for remittances from Argentina to the sterling area.

Under the existing import permit régime, the Argentine authorities are able to control both the volume and the origin of the various classes of imports. Therefore, while reduced grain shipments in 1940 caused the total value of Argentine exports to decline, imports were also reduced, although the year closed with an adverse trade balance of over 70,000,000 pesos compared with a favourable balance in 1939 of 235,000,000 pesos. In order to maintain equilibrium in the international balance of payments, it is calculated that Argentina must register each year a favourable trade balance of some 450,000,000 pesos. Although, during the first two months of 1941, despite a fall of 46 per cent. in the value of exports compared with the corresponding period of 1940, a favourable trade balance of nearly 50,000,000 pesos was re-established, this was only achieved through severe restriction of imports, the market value of which was cut down by 52 per cent.

Unsaleable Primary Products

South America's chief problem is the accumulation of large unsaleable surpluses of primary products, because of the loss of European markets. In Argentina, large quantities of grain—particularly maize—are being accumulated, and, in order to protect farmers, the Government is buying it at considerable cost and with little chance of recoupment, whilst it is proposed to use maize as railway fuel. In view, therefore, of the present obscure economic outlook in Argentina, it is extremely doubtful whether increased freight rates will be granted to the British-owned railways, despite their financial difficulties, or that the Argentine Government is at present in a position to proceed with any plan for the acquisition of the British railways.

In the monthly foreign trade statistics issued by the Argentine authorities, electrical goods are included under the general heading of " machinery and vehicles " imports of which fell in the year 1940 to 129,000 metric tons, with a total tariff value of 107,061,000 pesos, from 157,000 tons costing 131,714,000 pesos in 1939 An even steeper fall occurred during the first two months of 1941, compared with the like period of 1940, when imports of " machinery and vehicles " fell to only 9,900 tons, value 8,013,000 pesos, from 34,500 tons, value 26,371,000 pesos.

Latest detailed statistics cover the year 1939 and show that out of total imports of " machinery and vehicles " worth 131,714,000 pesos imports of " machinery and motors in general " fell to 34,027,000 pesos from the 1938 figure of 51,550,000 pesos. Included in the 1939 figures were electrical wires and cables (14,623,000 pesos, against 15,131,000 pesos in 1938); electric motors and dynamos (2,817,000 pesos, against 3,983,000 pesos); and sundry electrical goods (21,915,000 pesos, against 25,677,000 pesos). Prominent among sundry electrical goods are radio-telephonic apparatus and materials, imports of which in 1939 cost 7,239,000 pesos, against 8,171,000 pesos in 1938.

Argentina is primarily a farming country, and the lack of iron and coal militates against the development of manufacturing industries. Nevertheless, there has been a notable expansion in such industries, which are receiving a great fillip during the present European hostilities. An official statistical survey of Argentina's industrial activities corresponding to the year 1938 has only recently been published, and shows considerable expansion since the previous census (1935). This is shown by the following items for 1938, compared with those for 1935 given in parentheses:—Number of establishments, 10,344 (8,876); employees, 241,824 (197,270); wages, 374,552,337 pesos (288,360,097); raw materials used, 1,523,670,779 pesos (1,062,853,021); fuel and lubricants used, 86,886,404 pesos (59,714,519); electricity purchased, 16,391,524 pesos (12,860,803); value of production, 2,416,776,400 pesos (1,804,392,295). A report issued in February by the Argentine Government demonstrates the important growth in the national electric light and power industry between the years 1935 and 1939. At December 31st, 1939, there were 946 electricity undertakings working in Argentina compared with 892 in 1935, situated chiefly in the Provinces of Buenos Aires, Santa Fé, and Cordoba. Generating capacity was as follows:—DC 144,614 kW (against 136,759 in 1935); and AC 1,185,865 kVA (against 1,099,670). The total production throughout Argentina in 1939 was 2,461,000,000 kWh.

Reciprocal Trade

Expressed briefly, the existing Anglo-Argentine Trade Agreement provides for trade reciprocity between the two countries. That is to say, to the extent that Britain buys Argentine products, Argentina guarantees to provide a corresponding amount of exchange in cover of imports from Britain, less the deduction of a reasonable amount for the foreign debt service. Nevertheless, wartime difficulties—such as the fall in Argentina's purchasing power through the loss of European markets, and Britain's shipping and export supply problems—have led to the factors already mentioned, namely, further developments of local manufacturing industries and increased trade relations with the United States. During the year 1940 exports to the whole of Latin America from the U.S.A. increased in value over those in 1939 by 27.8 per cent. to $726,776,000, the increase in " electrical machinery and apparatus " alone having been by over 19 per cent. to $40,600,000 from $34,100,000. Total imports from the U.S.A. in 1940 were 50 per cent. over those in 1939, at $106,877,000.

There must, however, obviously be limits to the expansion of Argentine trade with the United States, inasmuch as both countries are producers of more or less the same farming products, and therefore are competitors in world markets. But trade between Argentina and Great Britain is of a uniquely complementary nature so that, once the hampering conditions of war have been removed, there should be a speedy return to reciprocal trading and an increase in the market for British goods.

Illustrating the possibilities of Argentina, it may be mentioned that the potential hydro-electric power in the Republic is estimated at 5,000,000 H.P., of which only about 35,000 H.P. has so far been developed. Moreover, the average Argentine citizens as well as public bodies, etc., are very progressive and modern in their outlook, and, when possible, are keen purchasers and users of the most up-to-date services and equipment.

Taking the long view, therefore, British exporters to Argentina should endeavour to lay the foundations for post-war trade, and the following remarks may be found of practical utility. Three

ways of opening connections present themselves—namely, by the appointment of a local commission agent; through one of the large British importing houses established in South America; or by a personal visit by a representative who speaks Spanish. Prices must be keenly competitive, whilst it is essential that correspondence, catalogues, etc., shall be drawn up in Spanish, and that the metric system shall be employed in quotations and estimates. General advice may be obtained from the trade's export group, from the Department of Overseas Trade, from the British banks established in Latin America, or from the Chambers of Commerce, including the British Chamber of Commerce, Bartolomé Mitre 441, Buenos Aires, and the Argentine Chamber of Commerce in Great Britain, River Plate House, South Place, London, E.C.2.

Where there is a Payments Arrangement with Special Account—as in Argentina—payment for goods dispatched from the United Kingdom is required, under the British Defence Regulations, to be received here within six months. However, if there is an adequate reason for granting longer credit terms, it is usually possible to obtain an extension of time from the authorities.

A large proportion of trade is conducted by means of documentary bills sent through a bank for collection, although Argentine importers frequently open letters of credit which permit payment to be obtained against documents in London. When bills are sent for collection, the usance generally extends up to ninety days although many sight bills are drawn. A permit, known as a Prior Exchange Permit, must be obtained before any goods are ordered abroad. This duty falls upon the importer, but the exporter on this side should take the precaution of ascertaining that a permit has been granted. The policy of the Argentine Government is to control importation both as to articles and source on the principal of reciprocal trade, and, while many goods may now be imported without limit, in other cases quotas apply. The permits are normally valid for five months in respect of goods from the United Kingdom, the period being extended to seven months in the case of machinery in general.

Imports are divided into two groups: (1) those which are paid for at the official exchange rate of 17 pesos per £, and (2) those which are paid for at the preferential official rate of 15 pesos per £. Changes are made from time to time at the discretion of the authorities, but, generally speaking, the greater part of Argentina's imports falls into the first group, the second group covering articles which cannot be produced in the Republic or which are regarded as essential imports. At present, electrical goods of practically all kinds are paid for at the rate of 17 pesos per £.

A commercial visitor to the River Plate should avoid the summer months of January, February and March, if possible, but, generally speaking, there are no fixed buying seasons. Practically all the import merchants are centred in the capital city of Buenos Aires.

Three-Phase Motor Fields

Explanation of Reversal Arrangements

By A. Brady

THE accompanying diagrams explain why one phase of a three-phase induction motor winding must be reversed in order to obtain a rotating magnetic field and why the motor changes its direction of rotation with an interchange of any two terminal leads.

First, fig. 1 with its table (I) shows what would happen if one of the phases were not reversed. Each square represents 30 deg. and the phase angles have the following values:—Sine 30 deg. = 0.5, sine 60 deg. = 0.866, sine 90 deg. = 1, sine 120 deg. = 0.5, sine 150 deg. = 0.866 and sine 180 deg. = 0. It will be seen that the magnetic value throughout is uniformly zero.

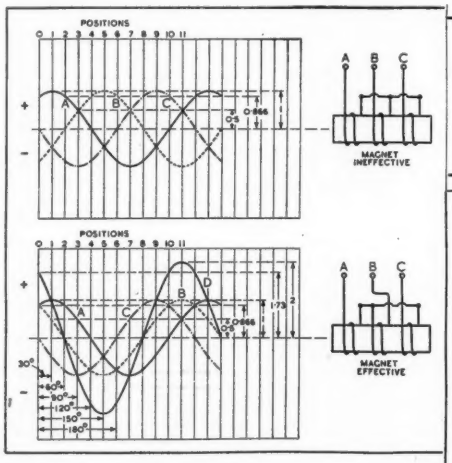


Fig. 1

Fig. 2

TABLE I

		A phase	B phase	C phase	Magnetic Value
Pos. 1	..	+1	−0·5	−0·5	0
,, 2	..	+0·866	0	−0·866	0
,, 3	..	+0·5	+0·5	−1	0
,, 4	..	0	+0·866	−0·866	0
,, 5	..	−0·5	+1	−0·5	0
,, 6	..	−0·866	+0·866	0	0
,, 7	..	−1	+0·5	+0·5	0

TABLE II

		A phase	B phase	C phase	Magnetic Value
Pos. 1	..	+1	+0·5	−0·5	+1
,, 2	..	+0·866	0	−0·866	0
,, 3	..	+0·5	−0·5	−1	−1
,, 4	..	0	−0·866	−0·866	−1·73
,, 5	..	−0·5	−1	−0·5	−2
,, 6	..	−0·866	−0·866	0	−1·73
,, 7	..	−1	−0·5	+0·5	−1

If, however, the star point, or end, of B phase is taken to start B and B start is taken to the star point, we have the three-phase values shown in fig. 2 (Table II). The resultant value of the combined three phases, which travel around the stator like an endless chain of alternative north and south poles dragging the rotor with them, is given by superimposed curve D.

As the connections of the generator supplying the current are not changed, if the current rises in, say, A phase to a given value and at a particular instant, as in fig. 3, it will likewise rise and fall similarly, as in fig. 4.

Fig. 3 shows the conventional sequence of A, B and C phases with the magnetic field travelling in an anti-clockwise direction; fig. 4 shows the result of interchanging the A and C leads, with the magnetic field travelling in a clockwise direction. The heavy vertical lines denote the rise and fall of the current under their phase headings during particular instants, the lengths of the lines being proportional to the values of the currents.

The time taken for any of the rotating magnetic poles to complete its journey around the stator, a circle of 360 degrees, will depend upon the number of poles. This and the supply frequency determine the speed of the motor, so that RPM = 60 (sec) × 50 (cycles) ÷ Pairs of poles.

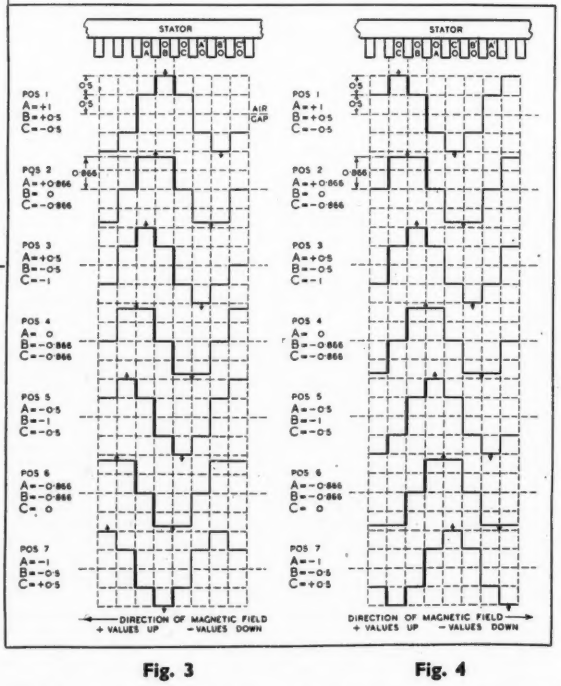


Fig. 3 Fig. 4

PERSONAL and SOCIAL

News of Men and Women of the Industry

WE are informed by Mr. R. Robinson, borough electrical engineer of Barnstaple, that **Mr. A. J. Kidwell,** mains engineer in the Electricity Department, is leaving Barnstaple to take up a position with the London and Home Counties J.E.A. He is succeeded by **Mr. L. W. Cooper,** of Chichester.

Mr. R. R. Kennan, has resigned from the Brush Electrical Engineering Co., Ltd., to take up the position of sales manager with Mono Pumps, Ltd., Manchester, and he has been presented by his colleagues at the Brush Co., with a silver salver. Mr. T. B. Keep, managing director, made the presentation and Mr. Kennan, in acknowledging it, said his connection with the sale of Petter oil engines in Ireland dated back a considerable time before he joined the company.

Mr. Dale, previously assistant chemist at the Barton power station of Manchester Corporation has been appointed power station chemist to the Norwich Corporation.

Lt.-Commander Haydn T. Harrison, R.N.V.R., has removed to 4, Dorset Court, Dorset Street, London, W.1.

Mr. F. W. Parkes, Dublin, has been elected president of the Society of Irish Electrical Traders, **Mr. R. J. Leonard** (Bective Electrical Co.) vice-president, and **Mr. C. W. Symonds** (Falk, Stadelmann & Co.) treasurer.

Capt. H. E. White, A.M.I.E.E., R.A.O.C., who before the war was assistant consumers' engineer with the Bournemouth & Poole Electricity Supply Co., Ltd., was married on May 17th to Miss N. E. Thomas, at Christchurch Priory, Hants.

Mr. F. Samuelson, who has been a director of The British Thomson-Houston Co., since 1934, has retired after forty-four years' service. He joined the company in May, 1897, and was in charge of the Turbine Department from its inception in 1903 until June, 1939. Since then he has been devoting his attention to consultative work.

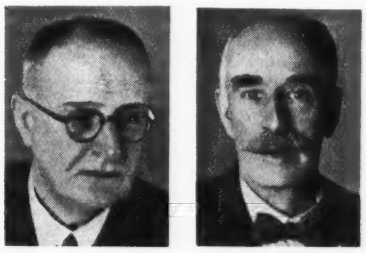
Mr. Samuelson was one of the pioneers in the development of the steam turbine in Great British. He has seen it grow from the simple Curtis type two-stage velocity compounded vertical machine of 500 kW to the 75,000 kW multi-cylinder horizontal turbo-alternator. He is a member of the Institution of Mechanical Engineers and has served on its Council and has been chairman of its Midland Section. He is also a member of the Institution of Electrical Engineers.

Finality in design is never reached and improvement will continue as knowledge of materials and other factors increases ; but it can be safely stated that it will not be the privilege of anyone in the future to live through a similar period of development in this sphere. His many friends in the engineering world will wish him the best of health in his well-earned retirement.

Mr. Alfred Henry Jackson, shop electrician, Lambeth, has been awarded the British Empire Medal for heroism during an air raid. The *London Gazette* states that while firemen were playing their hoses on a burning building, the roof of an electricity substation caught alight. Realising that the e.h.v. panel would blow out and possibly kill the firemen, Mr. Jackson, at great risk to himself, disconnected the supply although he knew the danger that existed in touching the panel.

May 16th at Henley's Head Office was marked by a pleasantly informal ceremony reminiscent of war-free days. A presentation was made to **Dr. Vaughan Williams,** O.M., the distinguished composer, of a gold fountain pen by Sir Montague Hughman (chairman), on behalf of Henley's. The directors and members of the Henley Choir were present. Since last autumn Dr. Vaughan Williams has voluntarily taken over the training of the Henley Choir. In making the presentation, Sir Montague paid a high tribute to Dr. Vaughan Williams for giving his services. Dr. Vaughan Williams suitably acknowledged the gift.

Mr. W. G. Groocock, who has been manager of the British Thomson-Houston Co.'s works at Birmingham since 1921, has retired after twenty-three years' service with the company. He joined the staff in March, 1918, as assistant at the Coventry works, of which he became manager in 1920, leaving there to take up the duties of manager of the Birmingham works in May, 1921. Mr. Groocock has had a wide experience in mechanical engineering and has



Messrs. E. M. W. Boughton and W. G. Groocock

always taken a particular interest in manufacturing methods and in the design and manufacture of jigs and tools. He was one of the pioneers of the turnover and preloading type of jig and an authority on limits. He has twice visited the United States on behalf of the company. Some years before joining the B.T.H. Co. he was an examiner in the tool room at Woolwich Arsenal.

Mr. E. M. W. Boughton, who has succeeded Mr. Groocock as manager of the Birmingham works of the B.T.H. Co., is a native of Exeter, and first joined the B.T.H. staff in 1910. He has had long experience in charge of the production side of the works and is well qualified to take over the reins of management. During the last war Mr. Boughton was a lieutenant in the Royal Engineers, and served mainly in the Ypres Salient and on the Somme. He was awarded the Military Cross with bar. He is an enthusiastic supporter of the social side of the works activities, being chairman of the works recreation club and president of the Ex-Service Men's Association.

At the Edison Swan Electric Co.'s works at Ponders End last week General Sir Peter Strickland, K.C.B., K.B.E., C.B., C.M.G., D.S.O., carried out an inspection of "A" Company, 27th Middlesex Battalion, Home Guard. At the gates of the works where a guard of honour was drawn up he was met by Lt.-Col. R. M. Hawkins, M.C. (of Belling & Co., Ltd.), who is in command of the

General Sir Peter Strickland inspecting the Home Guard at the Edison Swan works

Battalion, and by Major J. H. W. Morgan (of Edison Swan), officer commanding "A" Company. After inspecting the company drawn up on the green, the General addressed the men and congratulated them on their smart turn-out. This, he said, showed their efficiency and keenness and he had no doubt that they would acquit themselves nobly should the necessity ever arise. Before making a tour of the action stations General Strickland also inspected the "Ediswan" first aid, A.F.S., decontamination and fire-watching services. Among those who witnessed the inspection was Sir Felix J. C. Pole, chairman of Associated Electrical Industries, Ltd.

Mr. J. P. Tivey, of the Australian General Electric Pty., Ltd., Sydney, has been nominated as president-elect of the Institution of Engineers of Australia for the 1941 session.

Lowestoft Corporation has extended the period of service of **Mr. H. H. Saunders,** general manager of the Electricity and Transport Department, for one year.

Brighton Corporation Electricity Committee has extended the service of **Mr. G. Claughton,** power station engineer, who is sixty-six years of age, for a further twelve months.

Mr. R. Vine-Hall, general manager of the Sydney County Council electricity undertaking, has been nominated by the Council as an associate member of the British Electrical and Allied Industries Research Association. The *Electrical Engineer and Merchandiser* states that Mr. Vine-Hall succeeds the late Mr. H. R. Forbes Mackay as the representative of the Sydney County Council in the Association.

Mr. L. Hartland, for fifteen years showroom and radio manager for Troughton & Young, Ltd., is now serving as a pilot officer in the R.A.F.V.R. Communications can be sent to him at 17, Ripley Gardens, Barnes, S.W.14.

Dr. F. Simon, who delivered the May lecture at the Institute of Metals on Wednesday last, carried out his first research work, for his D.Phil. degree, in 1921 in Nernst's laboratory in Berlin. In 1927 he was appointed Professor Extraordinary at Berlin University and in 1931 he became Director of the Physical Chemistry Laboratory and Professor Ordinary in Breslau. From the beginning his work has been with low temperatures. The more technical aspect included the development of simpler methods of attaining these temperatures in order to make such work possible in non-specialist laboratories: his "desorption" and "expansion" methods for reaching liquid helium temperatures are now well known and are in use in various laboratories throughout the world. His earlier researches were also concerned with the supposed deviations from the Nernst heat theorem, which were found to be due to the existence of "internal" transitions and "frozen-in" states. This work led to a formulation of the theorem now generally accepted.

He left Germany in 1933 and took a research position in the Clarendon Laboratory, Oxford. He became Reader in Thermodynamics in 1935. In 1941 he was made a

Fellow of the Royal Society. In Oxford, apart from continuing his investigations into the properties of liquid helium, he has been chiefly concerned with the magnetic method of producing very low temperatures.

Mr. J. B. Morgan, electrical engineer to the East Grinstead Urban District Council, who was due for retirement, has agreed to extend his services for a further year and the Council has approved this.

Obituary

Mr. Justus Eck.—We regret to learn of the death of Mr. Henry Justus Eck, M.A., M.I.E.E., which occurred on May 21st at the age of seventy-five. Mr. Eck was the son of the late Justus Alexander Eck, a Russian, who settled in London about 1845. He was educated at King's College, London, and afterwards articled to the original Edison Telephone Co., working there for about a year; subsequently, after the amalgamation of the telephone interests in the United Telephone Co., he was articled to Paterson & Cooper, who sent him to Italy to superintend the installation of electric light in some of the chief theatres and factories in the vicinity of Milan. On his return to London Mr. Eck started business with Mr. Callow as Eck, Callow & Co., manufacturing electricians. In 1886 he entered Peterhouse, Cambridge, where he graduated with honours in natural science, also studying mathematics under Prof. J. J. Thomson and engineering under Prof. James Stuart.

On leaving the University he joined the firm of Laing, Wharton & Down, who were then taking up the City of London and other large lighting contracts, and remained with the firm in the position of assistant engineer and subsequently chief engineer for upwards of ten years, carrying out lighting, power and traction work in all parts of Great Britain. In 1898 Mr. Eck visited the United States to study electric traction developments. He designed and operated an enclosed conduit train at the Wimbledon Rifle Meeting in 1882, for the Electric Motor Syndicate. In 1900 Mr. Eck joined Geipel and Lange, and in 1901 went to the Union Electric Co., of London as technical manager and adviser, and became general manager. He was associated with electric launch work, the Callow-Eck system being successfully applied to both marine and river work. The design of large electric advertising signs also occupied his professional time, as well as light, power and railway schemes in this country and abroad. Mr. Eck was a founder of the Illuminating Engineering Society and of the Electrical Industries Benevolent Association, of which he was hon. secretary. It was a letter from him published in the ELECTRICAL REVIEW of December 10th, 1904, which publicly announced the inauguration of the Electrical Trades Benevolent Institution as the E.I.B.A. was originally called.

Mr. J. W. McKay.—We regret to record the death which occurred recently of Mr. James W. McKay, who was well-known in the electrical industry, having at one time been general secretary of the Electrical Wholesalers' Federation. Mr. McKay was educated at the South Wales University and afterwards entered the electrical industry. For some years he acted as resident engineer for South Wales and the West Country to the British Electric Traction and the Brush Electrical Engineering Companies. After a period as advertisement manager for the northern edition of one of the national daily papers Mr. McKay during the last war was concerned with the production of munitions. After the war he became British Trade Adviser to the German Embassy. He returned to the electrical industry in 1926 as general secretary of the E.W.F. He was also responsible for colliery electrification schemes in this country. Mr. McKay took an active interest in politics, and music was also another of his interests.

Mr. T. L. Miller.—The death occurred on May 21st, in his eighty-second year, of Mr. Thomas Lodwick Miller, O.B.E., M.Inst.C.E., M.I.Mech.E., M.I.E.E. Mr. Miller was educated at Liverpool Institute & Liverpool Royal Institution, and served his apprenticeship with Fawcett, Preston & Co., at the same time attending evening classes at the Liverpool School of Science and University College, Liverpool. In 1888 he became chief assistant to Prof. Hele Shaw at the University College, Liverpool, with whom he remained until 1890, when he went into private practice as consulting engineer, retiring in 1928. His consulting work included the Bootle lighting and tramways; Hoylake, Swinton, Barnsley, Pendleton, Atherton, Dundalk and other electricity undertakings, while abroad he was engaged on the hydro-electric scheme for lighting Khatmandu, and the design and construction of a large sugar refinery in China. During the last war he was general manager and secretary of the Liverpool Munitions Committee. He was a past president of the Liverpool Polytechnic and the Liverpool Engineering Society, and was chairman of the Manchester Section of the I.E.E. in 1906.

Mr. E. Smith, who recently died at Esher at the age of eighty-six, was associated with Ferranti, Ltd., until his retirement a few years ago. He was with the late Dr. S. Z. de Ferranti when he started his first factory in Charterhouse Square, London, in 1882, and for a considerable number of years was connected with the company's London meter depot.

Mr. E. Percy-Connor.—The death occurred recently at Helensburgh, as the result of an accident, of Mr. Ernest Percy-Connor, engineer in charge of the Glasgow Corporation Subway. He was forty-eight years of age.

CORRESPONDENCE

Every letter must be accompanied by the writer's name and address preferably, but not necessarily, for publication. The Editors cannot accept responsibility for correspondents' opinions.

Making-current Releases

WITH reference to the very useful article on "Force-trip Devices" by Mr. Lythall in your issue of April 11th, as many of your readers may obtain their first knowledge of this device through this article, I would draw attention to the fact that there are certain objections to the use of the term "force-trip devices."

The term used in the recently published B.S. Specification 936 for oil circuit-breakers for AC circuits up to 660 V is "making-current release." It may be that Mr. Lythall has overlooked this fact, and it is to be hoped that the term "force-trip device" will not be perpetuated.

*London, S.W.*1. J F. STANLEY,
Electrical Section.
British Standards Institution.

"Electric Power Stations," Vol. 1

REGARDING the review of this volume in your issue of May 9th I would like to add a few notes to the points raised regarding the advance made in the reduction of fuel consumption. The figure of 3.47 lb. per kWh generated is for the year 1908 and not 1918 as given in Table I. The figure of 1.70 lb. per kWh generated for 1921 is approximately correct and, if anything, is on the low side compared with returns made by official authorities.

Your reviewer mentions that a figure of 1.7 lb. was obtained at Carville "B" in 1915 and 1.4 lb. at North Tees in 1921. The figures I have to hand concerning these stations are :—

Carville "B" (commenced operation 1916), 1.7 to 1.8 lb. per kWh generated from 1916 to 1920, and 1.6 to 1.7 lb. from 1920 to date. Thermal efficiency about 17.5 per cent. in earlier years ; best annual figure recorded 19 per cent. approximately.

North Tees "A" (commenced operation 1922), 1.5 to 1.7 lb. per kWh generated from 1922 to 1926. North Tees "B" 1.25 to 1.4 lb. from 1927 onwards. Thermal efficiency varied from 17.5 to 23 per cent.

I am well aware that these stations were the forerunners of our present-day stations and, as such, are worthy of mention in honour of the engineers associated with their design, construction and operation, particularly the late Dr. C. H. Merz. Since the appointment of the Electricity Commissioners official returns relating to thermal efficiency and fuel consumption of power stations have been available. As a matter of interest I give herewith the fuel consumption per kWh generated for three very well-known undertakings over many years :—

Undertaking "A": 1905, 8.0; 1910, 6.6; 1920, 3.0; 1930, 2.0; 1940, 1.4.

Undertaking "B": 1920, 2.75; 1926, 2.10; 1927, 2.25; 1934, 1.55; 1936, 1.65; 1940, 1.25.

Undertaking "C": 1906, 5.0; 1916, 2.75; 1926, 2.38; 1937, 1.25.

It will be appreciated that the better way of comparing stations or plant is on the basis of heat consumption and not fuel consumption. I trust that this information will prove useful and clarify any misunderstanding and I thank your reviewer for his contribution.

Derby. T. H. CARR.

Earth-fault Protection

IN his comment on my article Mr. Benson states that a skilled man can erect metalclad wiring systems in a manner that can afford perfect protection. I disagree, as earthing and continuity difficulties are inherent in such systems. It is only necessary to consult recent Home Office and other publications to find this fact clearly recognised to-day.

It is agreed that in certain types of building some form of mechanical protection is necessary for cables, but as this protection is mainly provided by the cement plasters of walls and the concrete of floors, *metal* tubes are not absolutely indispensable for this purpose. The cables do not need this protection during the progress of the building, as they are not there, being drawn in at some later date; obviously, any mechanically durable material will serve as a protective duct, as witness the popularity of fibre ducts for this work.

Mechanical protection of cables does not, therefore, postulate the use of steel tubes, or steel under-floor ducts, so that the question of insulation and adequate protection are not really connected. In the installation of the future, non-metallic tubes will take the place of steel, and those points requiring an earth circuit will be served by means of copper conductors drawn into these tubes with the circuit wires. By this means continuity resistances can be kept to a reasonable level, and an improved degree of protection afforded; it is becoming clear that this desirable state of affairs cannot be provided by means of steel conduits.

Cambridge. T. C. GILBERT.

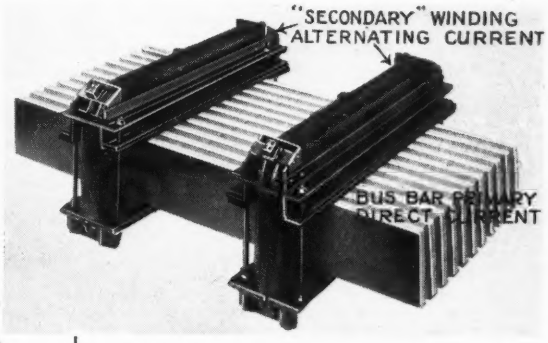
An Unusual Instrument Transformer

Measuring Large Direct Currents

WHEN large values are concerned the simple way of measuring DC, normally by determining the voltage drop across a shunt, is both costly and extremely wasteful of power. For example, a 20,000-A shunt for use in conjunction with an indicating instrument will consume more than 2 HP, or some 5 HP if required to operate a graphic or integrating instrument.

Only quite recently has a true DC "current transformer" become available. In underlying principle it is based upon the fact that the magnetising current taken by a choking coil will increase rapidly when the choke is provided with a second winding through which DC is passed. The greater the saturation of the core by the DC, the less will be the choking effect ; consequently more AC will pass at any given voltage and frequency. Theory indicates that for proportionality between DC "primary" and AC "secondary," and reasonable independence of variations in applied voltage, the core characteristics must be very special, including a well-defined "knee" in the B/H curve.

A number of these "transformers," needed in connection with the production of aluminium, have been made by Everett, Edgcumbe & Co., Ltd., for a full-load DC primary current of 50,000 A (ratio 40,000/10). In order to deal with both halves of the AC wave two cores are paralleled, but the AC turns are wound in opposite senses on the two cores, so that when the continuous and alternating fluxes are assisting one another in the one core they are opposing one another in the other core. By this means any inductive interference by the AC with the DC circuit is eliminated. During any given half-cycle the AC flux in the core with opposed windings will rise to a value just sufficiently above the DC flux to neutralise it and yet leave enough margin to induce the requisite back EMF. Meanwhile, during the same half-cycle the iron of the other core will be saturated, so that the half-wave of magnetising current will be narrow and high.



Choke-like DC "current transformer"

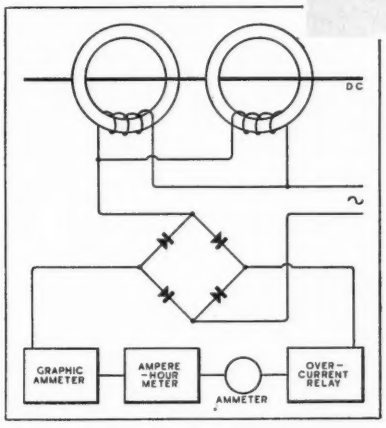


Fig. 1.—Transformer in association with rectifier-operated measuring instruments

These two currents are superposed upon one another, together providing a "secondary" (almost exactly proportional to the DC primary) that is conveyed through the measuring instruments, which are scaled direct in DC amperes.

It is of fundamental importance that the impedance in the AC circuit shall be the minimum. For this reason rectifier-operated instruments are utilised (as indicated in fig. 1) with the further advantage of evenly divided scales. Beside the indicating ammeter the equipment includes an ampere-hour meter and a graphic ammeter, as well as a protective over-current relay. The readings of all the instruments are, for practical purposes, independent of changes in the voltage and wave-form and frequency of the supply, as well as of the ambient temperature.

The graphical wave-form representation of the "secondary" current (fig. 2), taken from oscillograms, indicates (above) the alternating component in one of the cores, the current flowing during the opposed half-cycle being below the zero line; and (below) the resultant current due to the two cores, superposed before passing through the measuring instruments.

Although it has been in connection with the measurement of large DC that this form of "transformer" has been chiefly used, it has many other applications. It is, for instance, the only known means of insulating a DC measuring instrument when high-voltage tests have to be made. Again, it will conveniently enable an indicator to be placed at a considerable distance from the conductor carrying the "primary" current, since the secondary current may be given any desired rated value according to the resistance of the pilot leads.

Similarly, if the DC side is wound with fine wire and connected in series with a high resistance, the combination will form a high-voltage DC voltmeter free from the objections that the usual DC switchboard voltmeter is only available for measurements to earth and, should it be inadvertently open-circuited, would permit the full voltage of the system to appear between the instrument and earth. When operating through a DC "current transformer" any desired degree of insulation can be introduced, so that measurements between high-voltage lines can readily be made with both the instrument and its "secondary" winding solidly earthed.

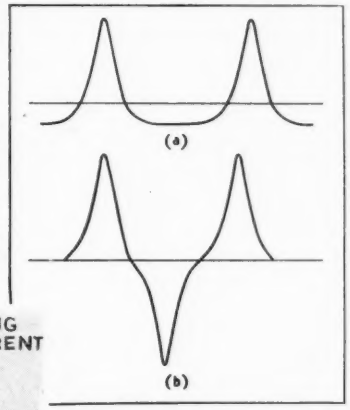


Fig. 2.—Secondary current wave-form (a) alternating in one core and (b) resultant of two cores superposed

Significance of Low Temperature

Institute of Metals Lecture

THE annual May lecture of the INSTITUTE OF METALS, the first of a series to be arranged outside London, was delivered by Dr. F. Simon (Reader in Thermodynamics, University of Oxford) in the Clarendon Laboratory on May 28th.

The lecturer began by discussing how it came about that lack of heat could influence the properties of matter, showing that at low temperatures one must expect phenomena connected with small energy changes. Before such alterations could be anticipated interest in this subject was restricted to a mere race downward, which attitude changed when the quantum theory indicated that the vibrational quanta in condensed matter corresponded to the region of low temperature. The consequent drop of specific heat towards zero K was of profound influence in respect of all properties of matter, particularly through its connection with the third law of thermodynamics.

Dr. Simon discussed the implications of this law with respect to theory and technology, as well as its corollary, namely, the unattainability of absolute zero temperature. He explained how every phenomenon that occurred in any particular temperature region could assist in reaching down to lower values. For instance, the discovery of magnetic states of matter between which there were very small energy differences had led to the Debye-Gianque method of attaining to lower temperatures than had been possible by means of gas liquefaction technique, while still lower regions might be reached by making use of nuclear paramagnetism. It appeared likely that the lowest regions might be productive of results of great practical interest, it being possible in this way to investigate phenomena inaccessible to direct experiment because the pressure or magnetic field requirements at higher temperatures would be prohibitive.

Liabilities in Wartime

Provisions of the New Bill

By F. E. Sugden, A.C.I.S., Barrister-at-law

PRACTICALLY every electrical contractor and retailer, in common with many other people, has been adversely affected by the war. Many have complained to me that while the cost of living has risen, their profits have been decreased whilst the wages of their employees have been increased considerably. Reductions of turnover have been brought about by the restriction upon many classes of electrical contracts. There have been increases in rates and water rates, not to mention the cost of electricity. The Government has realised the possibilities of temporary financial embarrassment and as a consequence the Liabilities (Wartime Adjustment) Bill has been introduced.

My task, as a lawyer, is to explain in simple non-legal language the details of this Bill and how the electrical man can take full advantage of it, including the procedure he should adopt in obtaining relief under the Bill which, no doubt, will soon become an Act. It is necessary to understand the broad principles of the Bill, namely, that it helps to effect a settlement of the electrical man's own debts which he has incurred with his creditors or, conversely, which people have incurred with him. It deals with the knotty problem of the collection of bad debts.

Many individuals and firms have been seriously affected by the war, in a financial sense. This article explains the new measure designed to ease their position

Some are finding difficulty in meeting their commitments regarding rent where they do not own their own workshops and business premises, whilst others are acquiring their business premises and showrooms through the aid of either a building society, a borough council, or a bank. Whichever method is adopted the debtor is still financially liable, the only difference being to a greater or lesser extent, according to the amount of interest charged by the mortgagee for such financial convenience. The Government tried to meet the difficulty by the Rents Restriction Act and the Courts Emergency Powers Act, but it was found that the latter only temporarily excused the redemption of capital which still remains, while the mortgagee could not foreclose without permission of the Court.

The Liabilities (Wartime Adjustment) Bill lays down that any person who is in serious financial difficulty owing to war conditions may apply to an officer, known as the Liabilities Adjustment Officer, for advice and assistance to enable him to arrive at an equitable and reasonable scheme of arrangement with his creditors and in particular such a scheme of arrangement as will enable him, if he carries on business or, but for war conditions, would have carried on business, to preserve his business connections and thus fully recover financially when circumstances permit. The Liabilities Adjustment Officer will give his services accordingly in any case where he considers that they may be of use. After investigation he will offer a just and equitable arrangement between the debtor and the creditor. If he is unable to evolve a scheme to which the debtor and all his creditors assent he has power to approve any scheme which appears to him to be just and equitable and to which debtor and the majority, in number and value, of the creditors whose debts have been proved have assented.

In fact, any scheme of arrangement under the Bill provides for the composition of debts. That is to say, the amalgamation of debts, the postponement of payment of debts, the assignment or the charging of any property of a debtor in favour of the creditors, and the management or disposal of the debtor's business, if any. The scheme may even vary the terms of any lease, mortgage or contract to which the debtor was a party. Of course, if a creditor objects to such a scheme of arrangement he can always appeal to the local County Court.

Enforcement of Schemes

Any approved scheme of arrangement may be enforced by the Court, which is usually the County Court. The application is made by any creditor bound thereby, but in a case where the scheme has been administered by the Liabilities Adjustment Officer it is made by that officer, and any disobedience of an Order of the Court may be deemed a contempt of court. Thus the effect of all these proceedings will be that a scheme will have the same enforcement as if it had been decided by the Court.

Coming now to the actual operation of the new Bill. If anybody in difficulties desires to avail himself of the procedure, either as a debtor or a creditor, he should make an application to the County Court of the district in which he resides and his case will be that, (a) owing to war conditions he is unable to pay his debts and to meet, as they fall due, any future liabilities in respect of obligations already incurred, or (b) he is in such a position that if he was required to pay his debts and to meet, as they fall due, any future liabilities he would be unable to carry on his business or would lose the means of recovering his business and thus lose his means of livelihood. Incidentally, this application may be made by (1) the debtor, (2) by any creditor. The County Court will act when a prima facie case has been made out, that is if the debtor or the creditor has satisfied the Court that, first the debts cannot be paid, and secondly that the position was brought about by the war.

The Court will then make what is termed a Protection Order, which means that any proceedings against the debtor or his property in respect of any provable debt or any proceedings against the debtor for the recovery of possession of any property shall be continued only with leave of the Court, which may impose restrictions and conditions, but the Court has the power to allow costs to the creditor which he has already incurred up to the issue of the Protection Order.

A Protection Order may (a) give such direction as to the management and disposal of the debtor's property (including his business, if any) as it thinks fit and appoint a receiver or a manager who may be the Liabilities Adjustment Officer himself, (b) charge the whole, or any part, of the property of the debtor in favour of the creditors, (c) direct that the whole, or any part, of the property of the debtor shall be placed in the hands of a trustee who, again, may be the Liabilities Adjustment Officer, or (d) require the debtor to pay money into Court or deliver to an officer of the Court any deeds or other documents or any property capable of actual transfer by handing over. Where a receiving order has been made and bankruptcy proceedings are still continuing, however, the debtor will be outside the jurisdiction of the Court.

Where an application has been made under the Bill for the services of the Liabilities Adjustment Officer, that officer must submit a report to the County Court on the debtor's affairs in any event or the County Court can refer the debtor's affairs to the Liabilities Adjustment Officer for his investigation and report.

Where a Protection Order has not been made the Court will make what is termed a Liabilities Adjustment Order which provides for the adjustment and settlement of the debtor's affairs in accordance with the Bill, where it is considered that protection should be granted to the debtor. The Order will contain provisions for the payment of debts proved in the proceedings either in full or to such an extent as the Court considers practicable and in such a manner regarding settlement as it thinks fit. In fact the Order may go further and decree that the debtor's property shall be realised before the Order is finally cancelled. The Court in settling the terms of liabilities and conditions it may, if it thinks fit, provide (a) for securing the maintenance of the debtor and his family, (b) for making provision so that the debtor and his family may have a home and furniture, bedding and clothing, including the tools of his trade, (c) provision for carrying on his business which, but for war conditions, would have continued in the normal course of events. The Court may also disclaim leases and contracts.

Creditors' Objections

Of course, none of these powers will be exercised without due regard to the creditors affected and after hearing their objections. if any. The Court also has the power to reduce the rent of any premises, should the debtor apply to the Court under the Rents and Mortgage Interest Restriction Act, and to adjust the terms of any arrangement whereby the debtor has obtained plant and equipment on hire purchase terms.

Where the debtor has a mortgage on his premises the mortgagee may realise the security and if the sum realised is less than the amount which was due from the debtor, he may sue the debtor for the balance if the Court makes an Order accordingly. If he does not sell the security then he is entitled to claim for the whole of the amount provided a Court Order under the Liabilities (Wartime Adjustment) Bill is obtained.

Where the Court makes a Liabilities Adjustment Order on the lines explained it will make provision for the payment of rent, rates and taxes, mortgage interest where there is a mortgage on the property, or where the premises have to be insured the payment of the insurance premium, having due regard to any rights the creditor would have in regard to the priority in reference to the payment of debts if the debtor had become a bankrupt. If it is not practicable to make a Liabilities Adjustment Order the Court has power to make an Interim Order pending further investigation.

COMMERCIAL and INDUSTRIAL NEWS

Preservation of Small Firms. Licensing of Exports.

Concentration and Combines

SPEAKING at the annual meeting of the London Chamber of Commerce on Thursday last week, Sir Geoffrey Clarke referred to the Government measure for the concentration of certain industries. He said that while nobody would dispute the necessity of this, the disappearance of many small and specialised industries would be a great national loss. It would appear that the tendency would be towards the formation of combines and, if so, there was a great danger that the smaller firms, as such, would not survive. Whatever steps were taken by the Government it would not be easy to avoid this result.

The President of the Board of Trade had invited the industries of this country to solve this very difficult problem themselves by mutual agreement. This was certainly the wisest policy, but when mutual agreement could not be reached, the only practical solution was to have schemes for the establishment of nucleus firms drawn up by the various trade associations, or failing this by Export Groups, and, if these were not acceptable to individual members, at any rate the Government would have some definite plan to consult before taking compulsory action.

Mid-Southern Bill Dropped

It has been reported to the House of Lords by the Lord Chairman of Committees that the promoters of the Mid-Southern Utility Bill do not intend to proceed with the measure. The Bill was introduced in the House of Lords to obtain authority for the issue of such further ordinary or preference stock as would produce (after taking into account premiums or discounts) the sum of £737,370, with borrowing powers up to 75 per cent. of the new share capital. Many local government authorities in the company's area had petitioned against the Bill.

Export Control

The Board of Trade has published a list showing the position with regard to the control of export on May 15th (Stationery Office, 6d. net). We extract from this the classes of electrical and allied goods which may not be exported without licence to any of the following countries :—Brazil, Chile, Colombia, Estonia, Finland, French Colonies (except French Cameroons, Equatorial Africa, Settlements in Oceania, New Caledonia, New Hebrides and Settlements in India), Greece, Latvia, Liechtenstein, Lithuania, Peru, Poland, Sweden, Switzerland, Vatican City, any port or destination in the Union of Soviet Socialist Republics on the Black Sea, Baltic Sea or Arctic Sea or to enemy territories (including any territory occupied by the enemy).

These goods are as follows :—Graphite, natural and artificial, and mixtures thereof; aluminium hollow-ware of a kind commonly used for domestic purposes; compounded gutta-percha; rubber, balata and gutta-percha; compounded unvulcanised rubber; rubber latex; reclaimed rubber; thread, rod, tubing sheeting, strip and slab wholly of balata, gutta-percha or hard or soft vulcanised rubber (including compounded rubber); armoured insulated submarine cable of external diameter, including the armour, of 1 in. or more; electric carbons, including electrodes; electric cable making machinery; AC and DC generators and generating sets (including rotary convertors and rotary transformers) having an output of not less than 150 watts or more than 800 kW; voltmeters and ammeters of the circular type of a diameter (including the bezel) of 2 in. or more but not exceeding 7 in.; glass bulbs and shells for electric lamps and wireless valves; magnetos and parts; permanent magnets; pyrometers; searchlights and parts; sparking plugs; thermopiles and thermo-couples; paper-insulated wires and cables; wires and cables coated or insulated with materials other than paper; wire drawing and wire and cable insulating and covering machinery; wireless valves and other electric discharge tubes and parts; X-ray tubes and valves and parts. In the case of paper-insulated wires and cables the list of countries to which the prohibition applies is extended by the addition of many other countries, including Japan, China, Spain, Portugal, Iran, Iraq and Turkey.

Applications for licences should be made to the Export Licensing Department, Inveresk House, 346, Strand, London, W.C. 2, or forms obtainable from the Department on from any of the principal Custom Houses.

A St. Pancras woman meter reader in her new uniform checking over a specimen meter with a male colleague

Electrical Apparatus for Country Forges

"Under the spreading chestnut tree the electric smithy stands" may soon be the modern version of the well-known poem if a scheme sponsored by the Cheshire Rural Community Council, in conjunction with the Central Rural Industries Council, for instructing rural craftsmen in the use of welding plants and other modern appliances, meets with approval. In a report, which was to be presented lastSaturday(May 24th) the Cheshire Council states that twelve smiths have already purchased new machinery and plant under the Rural Industries Equipment Loan Fund. Moreover, many smiths have electric power available and are anxious to make the best use of it by means of electric drills and forge blowers. The rural industries organiser of the Cheshire Council considers that the Equipment Fund should provide for power tools, and that this would solve the problem of the acute shortage of labour.

Increased Coal Prices

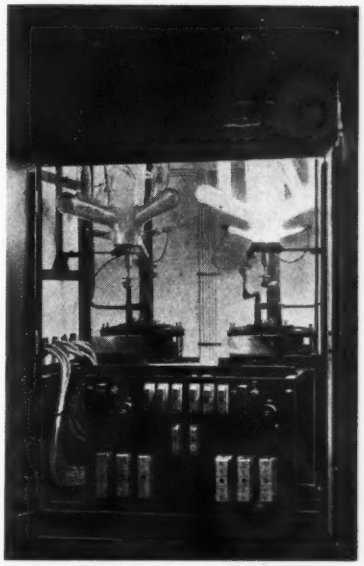
To meet the increase of 1s. per shift in the wages of adult miners which commences to operate from the first week of June the price of coal is to be advanced by 10d. a ton from June 1st. A further levy of 6d. a ton is to be made from July 1st to cover the guaranteed pay week under the Essential Work Order and this will necessitate a further consideration of coal prices.

Solving a Refuse Disposal Works Problem

The national salvage drive, with the consequent lower calorific value of refuse collected, has created a difficult situation for many refuse disposal works which rely on the burning of the refuse to generate the electricity needed to operate the works plant. Often, nowadays, the heat available is not sufficient for this purpose and, as it is not unusual for DC to be generated, it is not generally simply a straightforward matter of taking a supplementary supply from the local electricity undertaking.

In such circumstances, however, the problem can frequently most easily be solved by utilising a mercury arc rectifier unit together with an appropriate transformer. Such an installation has, indeed, recently been completed at the Reigate Corporation's disposal works at Earlswood. Here, till recently, two generating plants were in commission using steam from the refuse handling plant. One is a 60-kW Belliss compound set generating at 220 V DC, the other a Sissons unit direct coupled to two DC generators in tandem, rated respectively at 11 kW, 220 V, and 19 kW, 80-100 V. The 200-V supply is required for the refuse handling plant, paper and tin presses, main pulverising plant, workshops, offices, workmen's cottages, etc., while the lower voltage serves for battery charging for the electric collection vehicles.

When difficulties arose in producing sufficient steam to operate the generators, an alternative electricity supply was secured by taking a 400-V, 3-phase, 50-cycle supply from the local electricity undertaking and installing a twin-bulb Nevelin mercury arc rectifier (with two 3-phase bulbs) with an output of 37 kW, 220 V DC. In conjunction with this a 45/60-kVA 3/6-phase transformer has been provided. Control is by means of two 100-A single-pole Statter metalclad switches fitted with the usual protective devices. The rectifier panel has been neatly matched up with the switchboard. The efficiency of the apparatus is given as between 85.5 and 88 per cent. over the range from quarter to full load. The installation has now been running for some weeks and Mr. A. E. Clouds, works engineer and manager of the works, expresses complete satisfaction with its operation.



37-kW Nevelin mercury arc twin-bulb rectifier set recently installed at the Reigate refuse disposal works

Aid for the E.I.B.A.

The Northern Counties Area Committee of E.D.A. is organising a scheme in aid of the E.I.B.A. There are nearly fifty prizes consisting of electrical appliances which have been presented by various electrical manufacturers. The tickets are 1s. each and books of receipts are obtainable from Miss Watson, E.D.A. office, 47, Pilgrim Street, Newcastle-on-Tyne, 1.

Finchley Electricity Charge Disputed

At the Highgate Police Court on May 21st Carrimore Six Wheelers, Ltd., were summoned by the Finchley Corporation for the recovery of £73, the balance of an amount stated to be due for electricity supplied to the company. A solicitor for the plaintiffs said that the defendants agreed to go on to the commercial tariff, but an agreement had not been concluded and so the Corporation charged under its statutory tariffs.

For the company it was maintained that a contract had been concluded. The whole of the Corporation's case depended on its satisfying the Bench that a contract upon which it

was insisting vigorously for nine months was never a contract. The case was misconceived and the Council should have taken action within six months under the Act and have claimed upon the proper basis.

After a long retirement the magistrates dismissed the case, each party to pay its own costs. They found that there was an agreement and £2 12s. was owing under it, but the Council should have taken action within the statutory time. They agreed to state a case for a higher court.

Registered Electrical Contractors

The following applications for registration have been accepted by the Executive Committee of the National Register of Electrical Installation Contractors at its meetings since January:—Stalybridge, Hyde, Mossley & Dukinfield Transport & Electricity Board, Stalybridge; Stan Greenhalgh, The Rock, Bury; Charles H. Corbishley, Macclesfield; F. Etchells, Manchester; Beckett & Wheatley, Aston, Birmingham; and B. Svenson & Co., Ltd., Hull.

At the April meeting one application was declined.

Wages in the Cable-making Industry

The Joint Industrial Council for the Electrical Cable Making Industry announces that the cost of living figure on May 1st (100 per cent. above the 1914 level) will not involve any alteration in wages on the third pay-day in June.

Changes of Address

Davies, Kent & Stewart, Ltd., have removed to 14–18, Emerald Street, London, W.C.1, which adjoins their old premises.

Arco Electrical, Ltd. (Armature Repair Co.), is now carrying on business at 55, Hatton Garden, London, E.C.1 (telephone: Holborn 3179).

The address of the Manchester branch of the British Thomson-Houston Co., Ltd., is now 15, Quay Street, Deansgate, Manchester 3. The telephone number remains unchanged. The change of address is necessitated by the requisitioning of storage space in the old premises for A.R.P. purposes.

The new address of Charles White (London), Ltd., is 54, Wilson Street, London, E.C.2, and they will be glad to receive manufacturers' catalogues.

The Major Manufacturing Co. has transferred its London office to 88, Portland Place, London, W.1.

William Coates & Son, Ltd., have opened offices and stores at 20, Harberton Drive, Belfast, and ask for catalogues and price lists from manufacturers of all classes of electrical material.

The Bristol branch of Foster Transformers & Switchgear, Ltd., has been removed to 200, North Street, Bedminster, Bristol, 3 (telephone: Bristol 64261).

The Electricity Board for Northern Ireland has transferred its head office to Rosemount House, Greyabbey, co. Down. The Board's meter department in Linenhall Street, Belfast, and the repair and maintenance department in Athol Street, Belfast, have also been transferred to Greyabbey.

Hirst, Ibbetson & Taylor, Ltd., have transferred their Liverpool branch to 99, High Street, Wavertree.

Trade Announcements

Aerialite, Ltd., has closed its London office and all orders and communications should be sent to the company's head office, Castle Works, Stalybridge, Cheshire. The company is still maintaining the two following representatives in the Southern area:—Mr. C. K. Todd, 21, Castleton Road, Goodmayes, Essex (telephone: Seven Kings 1069), who covers outer London, Wales and the South Coast, and Mr. G. Rees, 28, Hanson Street, Great Portland Street, London, W.1 (telephone: Museum 9094), covering the London City area.

New Catalogues and Lists

Sloan Electrical Co., Ltd., 41, Kingsway, London, W.C.2.—A leaflet giving particulars of A.R.P. equipment including the "Bomgrip" incendiary bomb handling device, protective helmets, stirrup pumps, visors, etc.

Metropolitan Electric Supplies, Metway Works, 52, King Street, Brighton.—List No. 1541 giving details of "Metway" elements for fires, irons, kettles, saucepans, etc.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

OZON, type "P" (Printers) vacuum lamps formerly made in Holland; believed to be now made in England.

Electrically driven slicing machines for oranges for marmalade making.

SYNET electric pads.

Suppliers in England of lamps made by Mariol Electrical Co. of U.S.A.

BISRAY appliances.

DAWSON dish washer.

TRADE MARK APPLICATIONS

THE following applications for British trade marks have been received. Objections may be entered within a month of May 21st.

Magnotectic. No. 614,467, Class 1. Chemical preparations used in brazing, soldering, welding and in the treatment and manufacture of metals. The British Oxygen Co., Ltd., Grosvenor House, Park Lane, London, W.1.

Nectacon. No. 613,975, Class 9. Scientific instruments and apparatus and electrical apparatus; all being goods not included in other classes. Imperial Chemical Industries, Ltd., Wexham House, Slough, Bucks.

Bituwax. No. 614,316, Class 17. Electrical insulating substances consisting principally of wax. Bitulac, Ltd., Collingwood Buildings, Collingwood Street, Newcastle-on-Tyne.

Order Against Commissioners

Terms of South Wales Power Issue

IN a King's Bench Divisional Court on May 21st, the Lord Chief Justice and Justices Humphreys and Singleton had before them a motion by the South Wales Electric Power Co. for orders directed to the Electrical Commissioners for prohibition and mandamus.

Mr. Craig Henderson, K.C., for the Power Co., said that the prohibition sought to prevent the Commissioners from imposing certain terms upon the Power Co. concerned with the raising of further capital and the mandamus was to compel the Commissioners to hear and determine according to law an application by the company for the approval of a scheme to introduce new capital. The Power Co. under its special arrangements could generate electric power for supply to existing authorised undertakings and in some cases to individuals where there was no authorised undertaking. The finances of the company were governed by an Act of 1932 and under it the company was authorised to raise additional capital and there was a proviso which gave the Commissioners power to make a Special Order for the raising of further capital if the company made application.

The matter arose out of a desire by the company to raise additional capital to the extent of one million pounds. It had observed all the necessary formalities with regard to the application. When the matter reached the Commissioners they said they would make the Special Order if the company would give an undertaking that it would not exercise its powers to raise the capital until the terms of issue of shares were approved by them. Counsel pointed out that that meant the financial control of the company passing from the directors to the Commissioners and when the time came for the issue of shares in a market which fluctuated from day to day, the directors would have to go to the Commissioners before they could move.

Counsel contended that that was *ultra vires* on the part of the Commissioners who, since they approved the scheme, could not make a bargain with the promoters as to how the scheme was to be carried out. They could do no more than that which appeared on the face of the document which would eventually be subject to a resolution of both Houses of Parliament. Counsel quoted cases in support of his contention that the Commissioners had no power to impose the condition they were seeking to impose and that they had no right to ask for any undertaking. The mandamus the company asked for was that the Commissioners should proceed to make the order without imposing any condition.

The Attorney-General (Sir Donald Somerville, K.C.) submitted that here the question was whether it was the duty of the Commissioners, Parliament having empowered them to determine the amount of the increase in the capital, to take proper steps to satisfy themselves that any increase they authorised was properly relevant to the expenditure. They had to be satisfied that the issue was put on the market at the proper rate at the time of issue. The question of increase was formerly a matter for Parliament, but now the Commissioners dealt with the matter and counsel submitted that they had to have regard to all relative matters, including the terms of issue. The Commissioners were satisfied with the purpose for which the additional capital was required and were prepared to make the Order, subject to the condition named, and the Attorney-General contended that the Court had the power to make the condition.

Mr. Craig Henderson in reply submitted that the Commissioners had nothing to do with the terms of issue. In any case the Treasury had to approve it. Replying to the Lord Chief Justice, the Attorney-General said assuming that the Court made an order for prohibition, he was prepared to undertake to issue the Order forthwith, with the Treasury clause in it.

The Lord Chief Justice in giving judgment reviewed the facts of the case, and said that in seeking to add a condition under which they would be the masters of the finances of the company instead of the directors, the Commissioners were acting in excess of their powers. They had no right to ask for such an undertaking, having regard to the fact that they were satisfied that the capital asked for was needed. The Attorney-General had said that the Commissioners would issue the Order if the Court acceded to the prohibition asked for. The Court now granted this prohibition order and the Commissioners would act in accordance with the undertaking given to the Attorney-General. Justices Humphreys and Singleton agreed and the Power Company was given the costs of the motion.

ELECTRICITY SUPPLY

Manchester Coal Costs. Reconditioning at Walton & Weybridge.

Chesterfield.—NEGOTIATIONS WITH POWER COMPANY.—The Derbyshire and Nottinghamshire Electric Power Co. has agreed to supply at its own cost an underground e.h.v. trunk feeder to the site of a substation. The company also agrees to the Corporation's maximum demand being increased subject to a guaranteed minimum monthly payment. The Corporation is also to have the right to increase by notice such maximum demand for which the company would make provision in its cable capacity, in which event the guaranteed minimum monthly payment is to be increased pro rata to the additional demand. Accordingly the borough electrical engineer has been authorised to discuss with the Electricity Commissioners the question of an additional bulk supply transformer substation and the Electricity Committee has agreed to a monthly minimum payment to the company conditional upon the latter's agreeing to meet a maximum demand not exceeding a certain limit.

LOANS. — The Corporation Electricity Committee is seeking sanction to borrow £2,500 for mains and services and £750 for meters.

Darlington. — NEW SWITCH-HOUSE. — The Town Council has received sanction to borrow the necessary sum for the erection of a switch-house.

Exeter.—FIRE PREVENTION.—The Corporation Electricity Committee states that acting upon suggested precautions advised by the Electricity Commissioners in regard to the prevention of fires caused through failure of switchgear when clearing heavy faults or through the discharge of burning oil and vapour into switchrooms, the city electrical engineer has arranged for vent piping to be fitted to twenty-two switch units at the power station and carried to points outside the building, at a cost of £122.

Heston & Isleworth.—SHELTER HEATING.—The Town Council is to provide electric heating in air-raid shelters.

Jedburgh.—STREET LIGHTING.—The Town Council at its last meeting adopted a recommendation to introduce a system of modified street lighting next winter.

Kent.—DRYING APPARATUS.—To provide drying facilities at various premises the Education Committee is to install radiators, electric fans, etc., costing £640.

Kirkburton.—OBJECTION TO OVERHEAD LINES.—The Urban District Council is to object to the proposal of the Electrical Distribution of Yorkshire, Ltd., to erect overhead lines at Flockton.

London.—HACKNEY.—Sanction has been received by the Borough Council to the borrowing of £1,000 for the replacement of sub-distribution boards at the generating station and £1,500 for an extension of the ferro-concrete roof of the meter room.

HAMMERSMITH. — The Borough Council Executive and Civil Defence Committee has authorised the purchase for emergency use of six e.h.v. switch units at an estimated cost of £1,900, subject to the consent of the Electricity Commissioners and H.M. Treasury.

Manchester.—COAL COSTS.—At last week's meeting of the Corporation Electricity Committee it was stated that the latest increase of 2s. 3d. a ton in the price of Lancashire coal for industrial use would result in an increased expenditure by the Department in a full year of £26,000. In the year ended March 31st, 1941, there had been a mean increase in the price of all grades of coal amounting to 2s. 11d. a ton.

Middlesbrough. — SUBSTATION IMPROVEMENTS.—Application is to be made by the Town Council for permission to improve a substation.

Northants. — MOBILE X-RAY UNIT. — A mobile X-ray unit costing about £200 is to be purchased by the County Council Health Committee.

Portland.—PREPAYMENT METER RESTRICTIONS.—At a recent meeting of the U.D.C. Electricity Committee it was reported that several applications had been received from consumers to have their quarterly meters exchanged for prepayment meters. The consumers would thus avoid the payment of the minimum charges. There were about 140 consumers with slot meters whose quarterly consumption had not reached double figures.

Slot meters cost about three times as much as ordinary meters. The electrical engineer was accordingly authorised to refuse to install a slot meter where he does not consider it advisable.

Stoke-on-Trent. — METERS. — The Corporation Electricity Committee has obtained sanction to borrow £5,000 for meters.

EXTENSIONS.—Supplies are to be provided to the Mill House, Fanton Road, Bucknall, at a cost of £150 and to the "Welsh Harp," New Street, Longton (£120). In addition distributors are to be relaid in the Hanley area at a cost of £950.

EMERGENCY LIGHTING.—The Corporation Emergency Committee is to purchase an emergency lighting set at an estimated cost of £106.

Southend-on-Sea.—POSSIBILITY OF INCREASED CHARGES.—In view of the increased consumption of electricity supplied on the contract rate, probably due to the use of electricity during the daytime in permanently blacked-out rooms, the Corporation Electricity Committee has decided to warn consumers that unless steps are taken to curtail the use of electricity during daytime, there will be no alternative but to recommend that the rate be increased.

Walton & Weybridge. — RECONDITIONING COOKERS.—At a recent meeting of the Town Council the Electricity Committee recommended that no more cookers should be bought for hiring out to consumers owing to the increased cost, that no more kettles should be bought because the usual types were no longer obtainable, and that existing used cookers and kettles should be reconditioned. The recommendations were adopted.

Overseas

France.—ELECTRIFICATION SCHEMES.—A correspondent says that Marshal Petain's Government has decided to put into practice many of the plans for the electrification of the country, worked out by previous Governments. The Vichy Press is using this action to show that democratic government is only capable of making plans which it finds impossible to execute. One example is the electrification of the railways which was being pushed ahead as rapidly as possible before the outbreak of war. The line from Paris to Bordeaux was almost completed, and the State railways had already started on several important projects.

Certain lines, like the Nord, were not electrified and for very good reasons. Although plans were ready, it was considered inadvisable owing to the strategic position of the line. Engineers also pointed out that were the line electrified, and steam locomotives still run over the line to keep them in good condition, the steam might have a deleterious effect on the overhead wires and there would constantly be trouble.

Critics of the present regime point out, however, that Vichy is spending far too much on electrification in the face of its present heavy financial commitments, particularly the cost of the German army of occupation.

India.—BHIM SAGAR HYDRO-ELECTRIC SCHEME.—*Indian Engineering* states that tenders are now being considered for the construction of the Bhim Sagar Dam, a masonry dam about 146 ft. high in the deepest foundation bed, in connection with the Bhim Sagar hydro-electric and irrigation scheme, Kotah State, Rajputana. The estimated total cost of the scheme is Rs. 10,65,240.

The Glen Affric Scheme

The Parliamentary Correspondent of *The Times* states that M.P.s propose to table a motion that consideration of the Grampian Electricity Supply Company's Provisional Order relating to the Glen Affric hydro-electric scheme should be deferred until the opinion of the Central Planning Authority, to be set up by the Government, has been obtained. Without expressing any opinion on the merits of the scheme these members take the view that the House of Commons will stultify itself if it passes now a Bill which prejudges one of the very questions which the Central Planning Authority will have to consider.

In the meantime, the Grampian Company has made a statement to the Press in which it disclaims any responsibility for the secrecy surrounding the inquiry which was recently held into the matter. The decision to withhold publication of the proceedings was taken by the Secretary of State for Scotland. For its part the company desired then, and still desires, that the fullest publicity should be given to the whole of the evidence. It has always been ready and willing to be judged by the facts which were proved during the inquiry.

TRANSPORT

Sweden.—RAILWAY ELECTRIFICATION. — A *Reuter's Trade Service* message from Stockholm states that the Swedish Railway Board has prepared a scheme for the electrification of the main line through Norrland. It is emphasized that it is difficult to ascertain in the present situation whether further electrification would prove remunerative from a strictly financial point of view. With the present prices of coal, although comparatively high, the electrification of the lines on the new scheme would not be profitable. It is generally recognised, however, that electrification offers so many and such advantages from other points of view, among them the development of the power system in the country, that the initiation of a fresh programme is considered justified. For the next two financial years, 1941–42 and 1942–43, the Railway Board recommends the electrification of the junction lines Gaevle-Ockelbo (38 km), Sundsvall-Aange (95 km), Haelsingborg-Haessleholm (77 km) and Haelsingborg-Esloev (49 km). All these are junction lines to already electrified lines. Allowances totalling Kr. 34 millions will be asked for in the investment budget for the two years.

The Board also mentions other lines which might next be electrified later on, viz., Varberg-Boraas-Herrljunga (127 km), Borass-Alvesta (149 km) and Uddevalla-Vaenersborg-Herrljunga (92 km). The cost of the electrification of all these lines together with those mentioned above, is estimated, at present prices, at about Kr. 77 millions.

On the State railway system about 89 per cent. of the lines have so far been electrified, and the total length of lines on which electric traffic has been inaugurated is already about 4,000 km. Recently a new section of the northern main line, the section between Mellansel and Vaennaes, was opened for electric traffic, and in about a year the electrification of the northern main line will have reached Boden, so that it will then be possible to travel in electric trains from Traelleborg in the south to Riksgraensen far in the north, a distance of 2,171 km.

RADIO AND TELEPHONY

Australia.—NEW TELEGRAPH LINE.—According to the *Electrical Engineer & Merchandiser* provision of a new copper telegraph line from Darwin to Adelaide, a distance of 2,000 miles, at a cost of £1,000,000 is reported to be under consideration by the Postmaster-General's Department. It would augment the existing copper line and the original iron line which is still in service.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1*s. each*) *can be obtained from the Patent Office*, 25, *Southampton Buildings, London, W.C.*2.

1938

33749. "Advertising signs." Berkeley & Young Ltd., and G. L. A. Grundon. October 25th, 1939. (536008.)

1939

21912. "Thermionic valve amplifiers." A. D. Blumlein. July 28th, 1939. (536089.)

22302. "Mercury switches of temperature control devices for furnaces and the like." N. H. Freeman. August 1st, 1939. (536091.)

22318. "Electro-acoustic devices, particularly for telephone systems." Standard Telephones & Cables, Ltd., and P. A. Childs. August 1st, 1939. (536092.)

27772. "Construction and arrangements of thermionic valves for high-frequency reception." Hazeltine Corporation. October 22nd, 1938. (535969.)

28169. "Driving mechanism for vessels." H. G. C. Fairweather. (Allmanna Svenska Elektriska Aktiebolaget.) October 18th, 1939. (535972.)

28694. "Telephone systems." Automatic Telephone & Electric Co., Ltd. October 31st, 1938. (536058.)

28829. "Electric condensers." Standard Telephones & Cables, Ltd., J. F. Morley and P. W. Larsen. October 27th, 1939. (536022.)

28834. "Food preserving apparatus for use in refrigerating chambers." Westinghouse Electric International Co. November 5th, 1938. (536023.)

28853. "Protective device for use on dynamo electric machines." J. Beresford & Son, Ltd., and R. L. Gold. October 27th, 1939. (536025.)

28869. "Furnaces." G. H. S. Grene and Wild-Barfield Electric Furnaces, Ltd. October 27th, 1939. (536026.)

28990. "Welding machines." British Thomson-Houston Co., Ltd. October 29th, 1938. (536064.)

29002. "Arrangement for mounting the circuit breaker in ignition magnetos for internal combustion engines." Fabbrica Italiana Magneti Marelli. October 31st, 1938. (536065.)

29052. "Facsimile transmitters." Standard Telephones & Cables, Ltd. (G. Deakin). October 31st, 1939. (536098.)

29091. "Electro-acoustic apparatus." Marconi's Wireless Telegraph Co., Ltd. October 31st, 1938. (536066.)

29147. "Facsimile receivers." Standard Telephones & Cables, Ltd. (G. Deakin). November 1st, 1939. (536100.)

29222. "Suction cleaners." Hoover, Ltd. November 17th, 1938. (536139.)

29236. "Speed control of electric motors." J. Lucas, Ltd., and E. A. Watson. November 2nd, 1939. (Cognate application, 3806/40.) (536140.)

29722. "Electro-magnetic switch actuated by electric impulses." W. J. Dawson and Metropolitan Electric Supply Co., Ltd. November 9th, 1939. (536144.)

29879. "Method of, and apparatus for, the rectification or control of alternating electric currents." E. A. Hinksman. November 11th, 1939. (Cognate application, 5161/40.) (536032.)

29975. "Plug-and-socket type electrical connections." Ferguson Pailin, Ltd., and G. Pailin. November 13th, 1939. (536145.)

30058. "Electrically-driven engraving machine." H. L. K. Johnson. November 14th, 1939. (536146.)

30203. "Lampholders." British Thomson-Houston Co., Ltd., F. W. Thorpe and R. Maxted. November 16th, 1939. (536147.)

30525. "Volume control circuit arrangements." Marconi's Wireless Telegraph Co., Ltd., and E. E. Zepler. November 21st, 1939. (536035.)

30526. "Electric frequency meters." Marconi's Wireless Telegraph Co., Ltd., H. Jefferson and P. E. Jellyman. November 21st, 1939. (536106.)

31133. "Thermionic discharge devices." British Thomson-Houston Co., Ltd. November 30th, 1938. (Cognate application, 31134/39 and 31135/39.) (536070.)

32320. "Electromagnetic relays." Siemens Bros. & Co., Ltd., D. A. Christian, E. A. Bryan and W. T. Vosper. December 15th, 1939. (536151.)

1940

203. "Lifts." J. & E. Hall, Ltd., A. A. Read and S. T. Elvy. January 3rd, 1940. (Addition to 454605.) (536074.)

255. "Heat exchange apparatus." British Thomson-Houston Co., Ltd. January 5th, 1939. (536114.)

880. "Periodic wave generators, particularly applicable for use in television." Hazeltine Corporation. February 13th, 1939. (536153.)

929. "System of electrical remote control and supervision." General Electric Co., Ltd., and N. C. Smart. January 16th, 1940. (536075.)

1321. "Turbines." English Electric Co., Ltd., J. P. Chittenden and H. G. Yates. January 22nd, 1940. (536039.)

1713. "Systems for eliminating interference in radio receivers." Philips Lamps, Ltd. January 30th, 1939. (536041.)

1735. "Manufacture of silicon steel strip." British Thomson-Houston Co., Ltd. January 31st, 1939. (536119.)

2898. "Electrical signalling apparatus." Gent & Co., Ltd., and C. Remington. February 15th, 1940. (Addition to 493203.) (536122.)

2948. "Electric accumulator handlamps." H. Shelton. February 16th, 1940. (536124.)

3677. "Elastic fluid turbines." British Thomson-Houston Co., Ltd. March 1st, 1939. (536161.)

4042. "Process and apparatus for light-signalling by wireless radiations of short wavelength." E. Molina and D. Desmidt. March 4th, 1940. (536042.)

4605. "Maximum demand or load indicators for polyphase electrical circuits." W. F. N. Harper and P. & B. Engineering Co., Ltd. March 12th, 1940. (536164.)

5232. "Electric heating units." Westinghouse Electric International Co. March 29th, 1939. (536165.)

6035. "Electric immersion heaters." A. H. Stevens. (Power Patents Co.) April 3rd, 1940. (535989.)

6189. "Methods of sealing an electric conductor through a metal wall." British Thomson-Houston Co., Ltd. April 7th, 1939. (535990.)

6355. "Telephone systems." Electrical Research Products, Inc. April 18th, 1939. (535991.)

7332. "Discriminator circuits for use in automatic frequency control systems." Marconi's Wireless Telegraph Co., Ltd., and N. M. Rust. August 17th, 1939. (Divided out of 522939.) (535993.)

8430. "Compressors." British Thomson-Houston Co., Ltd. May 10th, 1939. (535995.)

9170. "Telephone systems." Automatic Telephone & Electric Co., Ltd., and E. Frydman. May 24th, 1940. (535997.)

11779. "Audio-frequency amplifiers employing potential variable capacity devices." Marconi's Wireless Telegraph Co., Ltd. N. M. Rust, J. D. Brailsford, A. L. Oliver and J. F. Ramsay. November 13th, 1939. (Divided out of 522476.) (536004.)

A.S.E.E. Annual Meeting

THE annual general meeting of the ASSOCIATION OF SUPERVISING ELECTRICAL ENGINEERS was held at Aldwych House, W.C.2, on May 19th, when a number of delegates from the provinces were present. Mr. F. W. Smith, chairman of the Association, presided, and in presenting the annual report of the Executive Council, expressed his gratitude to members for their loyalty during a trying period.

He welcomed the representatives from the districts, and paid a tribute to the way the branches had carried on with their work in face of extreme difficulties. The Council's appointment of fourteen additional district representatives during 1940 reflected credit upon the Association's administrative side, and led him to make some interesting comparisons with twenty years ago when he first acted as chairman.

The Association had contributed to the general good by its representation on various committees, and had been consulted on a large variety of matters by employers and Government Departments. The end of the war would raise a great many problems of vital importance to supervising electrical engineers. Such men would, as a body, hold a unique position. Organisation would be necessary, and in helping to solve the difficulties which would arise, the A.S.E.E. would be called upon to play its part. The time to think of these things was now—not to wait until the difficulties were upon them—and to take appropriate steps to build up a financial reserve which would enable the Association to render that service after the war which the membership would expect.

Greater than ever before was the necessity of organising within the Association those engineers who had not yet appreciated the necessity of collective action. Although they were doing well and the membership continued to increase, they must do even better.

The annual report of the Council indicated the wide and varied activities of the Association and showed that the difficult conditions of the past year had not prevented the carrying on of the greater part of the Association's work. The report and statement of accounts, which showed an improved and sound financial position, were unanimously approved.

With a view to safeguarding the immediate future of the Association's work, the meeting gave authority for co-opting past members of the Executive Council to serve on that body for the war period. Messrs. F. W. Smith, J. Munro, C. W. Bullock, D. Barke, E. Peacop and J. Flood were elected to fill six vacancies on the Council, and the chairman thanked the retiring members, Messrs. L. W. Medcalf, J. J. Smith and J. D. Reddy.

Among the matters discussed at the meeting were the Control of Employment Act, qualifications for membership, and a number of matters of national importance on which delegates conveyed views which were noted for reference to the Council. During an interval in the proceedings, Mr. S. G. Christian, vice-chairman, referred to the fact that Mr. F. W. Smith had first been chairman in 1921-22, was again elected chairman for 1930-31, and was now completing his third term in that office. To his chairman's medallion and bar had been added a new bar, and in presenting this, Mr. Christian paid a glowing tribute to Mr. Smith's work for the Association over a number of years. Mr. Smith, in expressing sincere thanks, stated he had striven to do his best for the Association since its inception and would continue to do so.

FINANCIAL SECTION

Company News. Liquidations and Bankruptcies. Stock Exchange Activities.

Reports and Dividends

Babcock & Wilcox, Ltd.—The full report and accounts for 1940 now issued confirm the preliminary figures already announced. The profit for the year was £717,347, as compared with £756,663 for the preceding year, to which is added £100,850 brought in, making £818,197. After providing for taxation, £451,058, and income tax on dividends for the year, £226,058, there is a balance of £593,197. It is proposed to pay a final ordinary dividend of 6 per cent., plus a bonus of 1 per cent., maintaining the distribution for the year at 11 per cent., less tax, and the balance carried forward is £105,282. The report states that the amount of unexecuted orders on the books at December 31st stood at approximately the record high level mentioned in last year's report. Due to the extension of the area affected by the war situation, the company has again written off out of profits certain balances owing to the company in Europe, rather than draw upon reserves for this purpose.

The Pressed Steel Co., Ltd., reports that after providing for depreciation, A.R.P. expenditure and contingencies, the trading profit for 1940 is £511,510, a decrease of £139,540 as compared with 1939. The net profit is £162,827 (against £228,440), and the ordinary dividend for the year is maintained at 27½ per cent., less tax. The balance carried forward is raised by £25,774 to £268,076.

The Calcutta Electric Supply Corporation, Ltd., reports a gross revenue for 1940 of £1,501,264, as compared with £1,398,955 for the preceding year, and a net revenue, less depreciation, of £514,250 (£476,191). After making certain provisions there is a balance available of £213,828. It is proposed to place £4,000 to retiring gratuity fund, £75,000 to war contingencies reserve, and to pay a final dividend on the ordinary stock of 3 per cent. (actual), making 7 per cent. for the year (against 8 per cent.). The balance carried forward is £49,575 (against £49,898 brought in). Sales of electricity during the year amounted to 448.8 million kWh (against 394.6 million kWh). It is proposed to distribute among the more responsible members of the staff in India a sum which will not exceed the equivalent of 2 per cent. of the Indian net profit.

The London Electric Wire Co. & Smiths, Ltd., reports a net profit for 1940 of £96,988, after providing for tax, as compared with £112,508 for 1939. The ordinary dividend for the year is maintained at 7½ per cent., by the final payment of 5½ per cent. No transfer is made to reserves (against £25,000), and the balance carried forward is £102,986 (against £87,303 brought in).

The West London & Provincial Electric & General Trust, Ltd., reports a net revenue for the year ended March 31st of £17,182, as compared with £20,310 for 1939-40, and a net profit of £11,315 (against £14,039). The final ordinary dividend is 3½ per cent., making 5½ per cent., less tax, for the year (against 6 per cent.), and £3,902 is carried forward (against £3,849 brought in).

The Electrolux Corporation (of America) reports a profit for 1940 of $2,074,528, as compared with $2,059,869 for the previous year. After providing for Federal income tax, the net profits amounted to $1,397,165, equivalent to $1.13 per share of common stock (against $1,658,469, equivalent to $1.34 per share). No excess profits were incurred and therefore no provision has been made.

Glenfield & Kennedy, Ltd., report a profit for the year to March 31st of £67,537 as compared with £70,549 for 1939-40. The final ordinary dividend is 5 per cent., making 10 per cent. for the year (same), with a bonus of 10 per cent. (against 7½ per cent.). The balance carried forward is £37,605, as against £35,979 brought in.

Newman Industries, Ltd., reports a net profit for 1940 of £46,467, as compared with £43,108 for the previous year. The ordinary dividend for the year is maintained at 20 per cent., income tax reserve receives £6,000, general reserve £10,000, preference share redemption reserve £2,000, additional depreciation reserve £5,000, and war damage reserve £1,000. The balance carried forward is £12,103 (against £11,936 brought in).

Crompton Parkinson, Ltd., have declared an interim dividend at the rate of 7½ per cent. actual on the ordinary and "A" ordinary stock.

S. Smith & Sons (Motor Accessories), Ltd., are maintaining the interim dividend on the preferred ordinary shares at 7 per cent., actual, less tax.

Ever Ready (Ireland), Ltd., report a profit for the year ended March 31st of £15,278, as compared with £12,497 for the preceding year. Reserves receive £8,865 and the ordinary dividend for the year is 10 per cent. (against 12½ per cent.). The balance carried forward is £1,454 (against £1,241 brought in).

Altrincham Electric Supply, Ltd., has announced a final ordinary dividend of 2½ per cent., making 12½ per cent. for the year (unchanged), and a final dividend of 2$\frac{13}{20}$d. per share on the 5s. deferred, making 1s. 1$\frac{13}{20}$d.

New Companies

Burgess & Speedie, Ltd.—Private company. Registered in Edinburgh May 12th. Capital £1,500. Objects: To carry on the business of manufacturers, importers and exporters of, dealers in and agents for the sale and purchase (on commission or otherwise) of all kinds of electrical and other instruments, appliances and components in connection with wireless telephony, telegraphy and television, etc. Directors: J. M. Burgess, "Backcroft," Dunblane, Perthshire and W. J. Speedie, 31, Friar Street, Stirling.

Holden & Hunt, Ltd.—Private company. Registered May 15th. Capital £30,000. Objects: To acquire the electrical and mechanical engineering and welding business of Nancy Holden at Cox's Lane, Old Hill, Staffs, carried on as Holden and Hunt. Directors: Nancy Holden and R. W. Holden, both of "Sunnyhurst," Mucklow Hill, Halesowen, Worcs. Solicitors: W. Stanley Mobberley & Son, Lye, Stourbridge.

Carbon Distributors of Great Britain, Ltd.—Private company. Registered May 17th. Capital £1,100. Objects: To carry on the business of manufacturers of and dealers in, agents for and salvors of electrical equipment and appliances, machinery, batteries, accumulators, components and accessories, etc. Subscribers: H. J. Espir and L. Espir, both of 66, Hayfield Road, Sanderstead, Surrey. Registered office: Room 9, 50, Pall Mall, S.W.

Proctor Industries Ltd.—Private company. Registered May 15th. Capital £100. Objects: To carry on the business of electrical engineers, manufacturers and repairers of, and dealers in, electrical equipment, machinery and appliances, wireless and television transmitters and receiving sets, etc. Directors: J. Proctor, "Briar Hedge," Bourne End, Bucks, and E. Caldwell, The Vicarage, Studham, nr. Whipsnade. Secretary: E. Caldwell. Registered office: 35, Clipstone Street, W.1.

Companies' Returns

Statements of Capital

East India Tramways Co., Ltd.—Capital £135,000 in £1 shares. Return dated January 13th, 1941. 133,334 ordinary shares taken up. £133,334 considered as paid. Mortgages and charges: Nil.

British Electric Transformer Co., Ltd.—Capital £1,000,000 in 190,625 preference and 375,000 ordinary shares of £1 and 1,737,500 ordinary shares of 5s. Return dated January 3rd, 1941. 190,625 preference and 400,000 5s. ordinary shares taken up. £266,518 12s. 6d. paid on 176,518⅜ preference and 360,000 ordinary shares. £24,106 7s. 6d. considered as paid on 14,106⅜ preference and 40,000 ordinary shares. Mortgages and charges: Nil.

Impex Electrical, Ltd.—Capital £14,000 in £1 shares. Return dated January 14th, 1941. All shares taken up. £14,000 paid. Mortgages and charges: Nil.

Radenite Batteries, Ltd.—Capital £20,000 in £1 shares. Return dated January 13th, 1941. 16,885 shares taken up. £4,654 paid. £12,231 considered as paid. Mortgages and charges: Nil.

Barbados Electric Supply Corporation, Ltd.—Capital £200,000 in 200,000 shares of £1 each. Return dated December 20th, 1940. 160,000 shares taken up. £91,051 paid. £61,949 considered as paid. Mortgages and charges: Nil.

Mortgages and Charges

A. O. Gibbons, Ltd.—Issue on October 23rd, 1939, of £300 debentures, part of a series already registered. (Notice filed May 9th, 1941.)

Jay Shades (1940), Ltd.—Satisfaction to the extent of £700 on May 8th, 1941, of debenture dated April 26th, 1940, and registered May 2nd, 1940.

Holfords Ltd. — Particulars filed of debentures for not more than £200 authorised April 24th, 1941, charged on the company's property, present and future, including uncalled capital, the amount of the present issue being £100.

Underwood (Electric) Ltd.—Three assignments of moneys due or becoming due under certain contracts, dated April 16th, April 24th, and April 30th, 1941, to secure all moneys due or to become due from the company to Martins Bank Ltd., not exceeding £7,200, £2,100 and £1,100 respectively.

L. Adams, Ltd.—Satisfaction in full on January 3rd, 1941, of first mortgage debenture registered February 20th, 1940.

Receiver Appointed

Sign Construction Co., Ltd.—E. G. White, of 3, Warwick Court, Holborn, W.C.1, was appointed receiver and/or manager on May 8th, 1941, under powers contained in instrument dated May 17th, 1939, in place of A. H. Partridge, deceased.

Liquidations

Owen Power Plant, Ltd.—Particulars of claims by June 24th to the liquidator, Mr. A. E. Middleton, 18, Essex Street, Strand, London, W.C.2. This notice is purely formal, as all known creditors have been, or will be, paid in full.

Bankruptcies

A. Lawson, formerly Abraham Lotterman, 261, Park West, Edgware Road, W.1, electrical engineer. The first meeting of creditors in this matter was held on May 20th at London Bankruptcy Buildings. The Official Receiver reported that the liabilities amounted to £88, and the assets to 4s. Debtor stated that his failure was due to liability under a judgment under a deed of separation. The estate was left in the hands of the Official Receiver.

A. E. Webster, wholesale electrical fittings dealer, 37, Walbrook, London, E.C.—First and final dividend of 5s. 11d. in the £, payable any day (except Saturday) at Bankruptcy Buildings, Carey Street, London, W.C.2.

E. A. Kann, electrical and radio manufacturers' agent, 61, Lansdowne Place, Hove.—First and final dividend of 11d. in the £, payable at 8, Old Steine, Brighton.

S. B. Juster, radio and electrical dealer, 153, Shirley Road, Croydon.—Application for discharge to be heard on June 18th at the County Court, Croydon.

STOCKS AND SHARES

TUESDAY EVENING.

THE remarkable achievement of London in its War Weapons Week has failed to exhaust the financial appetite of investment that, despite the national call and the response to it, insatiably demands satisfactory security. So far from gilt-edged stocks being weakened by the colossal outpouring of money into the war issues, the " safety first " markets remain very firm. We saw last week how a small basket of onions enabled an energetic member of the Stock Exchange to divert £34,300 into Savings Certificates, Defence 3 per cents. and the other loans, but his half-hour's work seemed to benefit, rather than to disturb, the gilt-edged list of stocks.

Good-class ordinary shares are still in constant request, and the supply of preference shares fails to keep pace with the inquiries for them. The uncertainties that surround the campaign in Crete act as a brake upon the advance in prices, but the restraint is a very mild one.

Home and Foreign Transport

Home Railway stocks have suffered no whit from the wage advances granted to railwaymen by the Railway Wages Tribunal. Market activity may have been stayed to some extent by concentration of public interest upon War Weapons claims, but prices have not reacted. British Electric Traction deferred stock has gained 15 points, at 765 and the 8 per cent. preferred rose 4 to 160, thus recovering in both cases the dividend deductions. A moderate amount of business in Tilling shares has left the price unaltered at 42s. 6d. Calcutta Trams are down 1s. at 18. South Americans attract little interest.

Siemens Shares

The average return from investment in the ordinary shares of British Insulated, Callender's, Henley's and Telegraph Construction, is, it will be noticed by reference to the price-tables, a trifle under 5 per cent. on the money. Yet the ordinary shares in Siemens Bros. stand at their par price of 20s., at which, on the basis of recent dividends, the return comes to 7½ per cent. on the money. The company is working full time. The dividend is payable once a year; it may be declared before these notes are in print. Expectation has looked for a repetition of the previous 7½ per cent. paid in each of the past four years, the figures during which latter period have been progressively good.

The explanation for the apparent neglect with which Siemens are treated by investors is generally assumed to be connected with the company's name, though actually Siemens Bros. & Co. are not now connected with the German concern of somewhat similar title. Siemens ordinary shares, at anything like £1, cum a full year's dividend, look a good purchase. When any prejudice there may be against the name of the company has died down, the shares should move up in value; for, under existing conditions, they would appear to be worth several shillings more than the current quotation. Siemens 10 per cent. preference shares are quoted at about 38s. It is rarely that they come to market; when they do, they are promptly snapped up.

Dividend Discussions

So far as can be ascertained, the impression prevails in the Stock Exchange that the incidence of taxation may lead to a trifling diminution in the dividends on the ordinary shares of the Home electricity supply companies. As against this, it is pointed out that the companies, or most of them, occupy a position of such financial strength as would enable them to continue the usual distribution, if the directors deemed it desirable, even though net earnings should fall away as compared with those of the corresponding period of 1940. Of late, prices in the Home electricity list have hardly varied, the only changes being those caused by ex-dividend markings. From this steadiness of prices the natural inference is that though dividends should be reduced, such a step on the part of the companies would have little, if any, effect in bringing sellers into the market.

After the War

Present day Stock Exchange experience shows that though dividends may be reduced and earnings contract, the proprietors of the shares seldom give any indication of nervousness. They retain their holdings and, in the popular phrase, hope for the best. It is so generally recognised that shrinkage of net profit is due, in most cases, purely to war conditions, that this factor is no longer regarded as being a reason why people should sell shares in companies whose return to normal dividend payments is a virtual certainty after we have won the war.

Preference Yields

Preference shares which yield a modest return, but with ample margin of security behind them, are Walsall Conduits fives, of which 500 shares are obtainable at 23s. Dividends are due at the end of March and September. At the price mentioned, the return is £4 6s. 9d. per cent. To pay the annual dividend takes £6,688, and in the last accounts there was £95,000 available to meet it. When the 10s. in the £ income tax is allowed for, the net return is little enough, but those whose business it is to select investment securities, know only too well the difficulty that exists in providing even 4½ per cent. on the money.

Such shares as South Metropolitan Electric 4 per cent. third preference, at 20s. 6d., Shropshire, Worcestershire 6 per cent. preference, at 30s. 9d., and County of London fours, at 20s. 6d., give no more than £3 18s. per cent. on the money. Electric Supply sixes, at 30s., return 4 per cent. Northmet sixes can be bought at the same price. These examples illustrate the demand that prevails for gilt-edged shares such as these preference are. They also show the severity with which to-day's taxation falls upon the incomes of those whose living depends upon the dividends they receive from fixed-interest securities.

New Llanelly Shares

New issues of shares are of such rare occurrence as to invest with unusual interest the 60,000 preference and 60,000 ordinary shares offered to its shareholders by the Llanelly & District Electric Supply Co. Holders of the old shares are given until May 30th (Friday in this week) to apply, at the price of 43s. for one ordinary and one preference. The market price of " the mixture " is 46s., so a small turn is offered to shareholders. Some of the other utility companies—gas and water, for example—have received official permission to make new issues during the war. Presumably the Llanelly Electric Supply Co. requires the money for purposes connected with the development and extension of its system.

Miscellaneous Matters

Cable & Wireless stocks have been steadily absorbed. The supply running short, the preference and ordinary rose 10s. and 30s. to 100½ and 65 respectively. Industrials keep very steady. General Electrics are better at 82s. 6d., Crabtrees at 23s. 9d., and Hopkinsons at two guineas. Lucas at 58s. 9d. are ⅛ up. Ever-Ready shares followed their 1s. rise of last week with a further gain to 27s. Reyrolle stiffened to 52s. 6d. Walsall Conduits have been—and still are—wanted by would-be buyers in the provinces. Allen West remain at 3s. 9d. Electric & Musical Industries at 8s. are 6d. better. London Electric Wire ordinary at 22s. 6d. are unaffected by repetition of the 7½ per cent. dividend. The accounts show that taxation has prevented the reserves from receiving their usual contribution. Babcock & Wilcox present a satisfactory report; the shares hold their advance to £2.

In the overseas group, Tokyo 6 per cent. bonds at 36½ are a point down. Of the shares upon which the dividends are generally paid tax-free, Oriental Telephones at 56s. 3d. are again ⅛ harder. A fall of 1s. 9d. in Palestine Electric " A " to 14s. 9d. is due, naturally, to war developments.

Marconi Marine

Marconi International Marine held its meeting on the Monday in this week, when there were presented the accounts and a dividend for the year of 7½ per cent. was approved. This is the same dividend as that for 1939. The report is of particular interest by reason of its statement that the effect of the present international situation on the shares and debentures of the foreign subsidiary and associated companies cannot be estimated. The directors have set aside £54,000 to meet losses which may have to be faced in respect of shares and debts in enemy countries. The board considers that any further loss that may ultimately be realised is more than covered by general reserve. The price of the shares retains the slight improvement at 22s. 6d., which the announcement of the final dividend for the year brought about, and the return on the money is the not unsatisfactory rate of £6 13s. 4d. per cent. There is a fairly free market in the shares.

River Plate Electric

The difficulty of obtaining anything like a living rate of yield on money from unimpeachable security, is too familiar for it to be more than a matter of passing interest; so far, at any rate, as discussion is concerned. From the practical point of view, it may be useful to mention that 2,500 River Plate Electric & Other Securities 6 per cent. non-cumulative £1 preference shares can be obtained in the Stock Exchange market at 26s. 9d., to give £4 9s. 9d. per cent. on the money. Dividends are due on the 1st May and November. The present price is ex the May dividend. On last year's figures the amount available for this dividend was £36,100, after allowing for income tax. To pay the annual charge requires £5,625. This is a trust company, and in spite of the preference dividend being non-cumulative, the security is well covered.

I.E.E. Meter Section Luncheon

THE only function to be arranged this session by the Meter and Instrument Section of the INSTITUTION OF ELECTRICAL ENGINEERS is a luncheon at the Waldorf Hotel, Aldwych, W.C.2, on June 6th, which will enable members and their guests to meet together informally. Applications for tickets (8s. each) should be made without delay.

ELECTRICAL COMPANIES' SHARES

Prices, Dividends and Yields

Company	1941 High-est	1941 Low-est	Dividend Pre-vious	Dividend Last	Middle Price May 27	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies							
Bournemouth and Poole ..	48/6	45/–	15	12½	46/3	..	5 8 3
British Power and Light ..	27/9	23/–	7	6	24/6	..	4 18 0
City of London	22/6	20/–	7½	7	21/3	..	6 11 9
Clyde Valley	36/6	33/6	8	8	35/–	..	4 11 5
County of London.. ..	34/6	30/–	10½	8	30/–	..	5 6 8
Edmundson's:							
7% Pref.	31/–	25/6	7	7	30/9	..	4 11 1
Ord.	25/6	23/6	6	6	25/6	..	4 14 0
Elec. Dis. Yorkshire ..	39/–	36/–	9	9	38/9	..	4 12 9
Elec. Fin. and Securities ..	40/–	39/–	12½	12½	40/–	..	6 5 0
Elec. Supply Corporation..	37/9	36/–	11½	10	37/6	..	5 6 8
Isle of Thanet	8/–	6/–	2	Nil	7/–	..	—
Lancs Light and Power ..	31/6	28/6	7½	7½	31/3	..	4 16 0
Llanelly Elec.	21/–	19/6	5½	5½	20/–	..	5 10 0
Lond. Assoc. Electric ..	16/6	12/6	5½	4½	15/9	..	5 14 3
London Electric	23/6	21/3	7	7	22/6	..	6 4 5
London Power Deb. Red...	105½	102	5	5	103	..	4 17 1
Metropolitan	34/6	31/–	10	8	31/3	..	5 2 3
Midland Counties	35/6	32/9	8	8	35/–	..	4 11 5
Mid. Elec. Power	35/–	33/3	9	9	35/–	..	5 2 10
Newcastle Elec.	26/3	24/6	7	7	25/–	..	5 12 0
North Eastern Elec.:							
Ordinary..	29/–	25/6	7	7	27/6	..	5 1 10
7% Pref...	32/6	29/–	7	7	32/6	..	4 6 2
Northampton	2⅛	39/6	10	10	41/3	..	4 17 0
Notting Hill 6% Pref.(£10).	9	8	6	6	8½	..	—
Northmet Power:							
Ordinary..	34/6	28/6	10	7	28/9	..	4 17 4
6% Pref...	29/6	27/3	6	6	29/6	+6d.	4 1 4
Richmond Elec.	20/–	18/–	6	6	18/9	..	6 8 0
Scottish Power	36/6	33/–	8	8	36/3	..	4 8 5
Southern Areas	16/6	14/6	5	5	16/3	..	6 3 0
South London	20/–	19/3	7	7	20/–	..	7 0 0
West Devon	21/6	20/9	5	5	21/3	..	4 14 1
West Glos.	18/3	17/3	4½	4½	17/6	..	5 2 10
Yorkshire Elec.	38/3	34/6	8	8	38/3	..	4 4 0
Overseas Electricity Companies							
Atlas Elec.	2/6	1/6	Nil	Nil	2/–	..	—
Calcutta Elec.	37/3	33/–	8*	7*	36/–	..	3 17 8
Cawnpore Elec.	30/–	26/–	10	10	28/9	..	7 5 9
East African Power ..	25/6	21/6	7	7	25/–	..	5 12 0
Jerusalem Elec.	22/6	19/3	7	7	20/–	..	7 0 0
Kalgoorlie (10/–)	12/6	11/–	7½	7½	12/6	..	6 0 0
Madras Elec.	25/3	23/6	8*	6*	23/9	..	—
Montreal Power	31	24	1½	1½	25	..	6 0 0
Palestine Elec. "A" ..	20/6	16/–	Nil	Nil	14/6	−1/9	—
Perak Hydro-electric ..	18/3	16/3	2½	6	17/6	..	6 17 2
Shawinigan Power ..	18½	15	83cts.	90cts.	15	..	—
Tokyo Elec. 6%	40½	36	6	6	36½	−1	16 9 0
Victoria Falls Power ..	76/6	69/6	15	15	73/9	..	4 1 4
Whitehall Investment Pref.	14/9	8/3	7½	7½	8/9	..	9 17 3
Public Boards							
Central Electricity:							
1950–70	110½	108	5	5	110½	..	4 10 6
1955–75	113½	109½	5	5	113	..	4 8 6
1951–73	108	105½	4½	4½	108	..	4 3 4
1963–93	101	94	3½	3½	100	..	3 10 0
1974–94	93	87½	3½	3½	93	..	3 10 0
London Elec. Trans. Ltd.	94	91½	2½	2½	94	..	2 13 2
London & Home Counties							
1955–75	108	106	4½	4½	108	..	4 3 4
Lond. Passenger Transport:							
A	120	109	4½	4½	119½	..	3 15 4
B	114	102½	5	5	112½	..	4 9 0
C	36	29	1½	3	31	..	9 13 6
West Midlands Joint Elec.							
1948–68	108	103	5	5	107½	..	4 13 0
Telegraph and Telephone							
Anglo-Am. Tel.:							
Pref.	103½	99	6	6	103½	..	5 16 1
Def.	24	21	1½	1½	22½	..	6 13 4
Anglo-Portuguese	17/6	12/6	8	8	12/6	..	12 16 0
Cable & Wireless:							
5½% Pref.	102	93	4½	5½	100½	+½	5 9 5
Ord.	63	52½	4	4	65	+1½	6 3 0
Canadian Marconi $1 ..	5/–	4/–	Nil	4cts.	5/–	..	3 4 0
Globe Tel. & Tel.:							
Ord.	29/–	26/–	7½*	6*	27/6	..	4 7 3
Pref.	27/6	25/–	6	6	27/6	..	4 7 3
Great Northern Tel. (£10)..	14	10½	20	20	12½	..	—
Inter. Tel. & Tel.	3½	2½	Nil	Nil	3	..	—
Marconi-Marine	23/–	19/9	7½	7½	22/6xd.	+6d.	6 13 2
Oriental Telephone Ord. ..	55/6	47/–	12*	11½*	2⅛	+⅛	4 1 10
Telephone Props.	11/6	11/–	6	6	11/3	..	10 13 4
Telephone Rentals (5/–) ..	7/9	6/9	10	10	7/3	..	6 18 0

Company	1941 High-est	1941 Low-est	Dividend Pre-vious	Dividend Last	Middle Price May 27	Rise or Fall	Yield p.c. £ s. d.
Traction and Transport							
Anglo. Arg. Trams:							
First Pref. (£5)	2/3	1/–	Nil	Nil	2/–	..	—
4% Inc.	8¼	4	Nil	Nil	4¼	..	—
British Electric Traction:							
Def. Ord.	830	740	45	45	765xd.	+15	5 17 8
Pref. Ord.	167	150	8	8	60+4	..	5 0 0
Bristol Trams	40/–	36/–	8*	8	36/3	..	4 8 5
Brazil Traction	8	6½	$1	50c.	7	..	—
Calcutta Trams	19/9	18/6	8	5½	18/–	−1/–	6 2 3
Cape Elec. Trams	17/6	16/6	5	5	17/–	..	5 17 4
Lancs Transport	39/9	36/–	10	10	38/9	..	5 3 1
Mexican Light:							
1st Bonds	40	34½	5	5	40	..	—
Rio 5% Bonds	85½	82½	5	5	85	..	5 17 8
Southern Rly.:							
5% Prefd.	53½	43½	5	5	50½	..	9 18 0
5% Pref...	94	77½	5	5	93½	..	5 7 0
T. Tilling	43/6	34/6	10	10	42/6	..	4 14 0
Tilling & B.A.	48/–	45/6	8*	7*	45/9	..	3 1 2
West Riding	36/–	34/–	10	10	36/–	..	5 11 1
Equipment and Manufacturing							
Aron Electricity Ord. ..	18/6	16/–	15	Nil	17/6	—	—
Assoc. Elec.:							
Ord.	41/–	38/3	10	10	40/–	..	5 0 0
Pref.	36/–	33/3	8	8	35/–	..	4 11 5
Automatic Telephone & El.	47/3	32/–	12½	12½	41/3	..	6 1 1
Babcock & Wilcox ..	43/3	39/–	10	11	40/–	..	5 10 0
British Aluminium ..	43/6	39/–	12½	10	40/–	..	5 0 0
British Insulated Ord. ..	88/3	78/9	20	20	82/6	..	4 17 0
British Thermostat (5/–)..	12/3	10/6	18½	18½	12/6	+6d.	7 8 0
British Vacuum Cleaner(5/–)	6/3	6/–	40	12½	6/3	..	10 0 0
Brush Ord.	4/3	3/6	Nil	Nil	4/–	..	—
Callender's	65/6	58/6	15	15	61/3	..	4 17 9
Chloride Elec. Storage ..	63/6	60/–	15	15	62/6	..	4 15 10
Consolidated Signal ..	65/–	60/–	17	17	62/6	..	5 8 7
Crabtree (10/–)	23/9	21/3	17½	17½	23/9	+⅛	7 7 4
Crompton Parkinson:							
Ord. (5/–)	19/–	17/9	30	20	18/9	..	5 6 8
E. K. Cole (5/–)	4/9	2/9	10	Nil	4/6	..	—
Elec. & Musical Industries (10/–)	8/6	7/3	5	Nil	8/–	+6d.	—
Electric Construction ..	27/6	25/–	13½	10	27/6	..	7 5 6
Enfield Cable Ord. ..	51/–	45/–	16½	12½	45/–	..	5 11 3
Electrical Switchgear (10/–)	22/6	20/–	16	10	20/–	..	5 0 0
English Electric	31/6	29/–	10	10	31/3	..	6 8 0
Ensign Lamps (5/–) ..	16/3	15/–	25	25	15/–	..	8 6 3
Ericsson Tel. (5/–) ..	37/3	35/–	25*	22*	35/–	..	3 2 10
Ever Ready (5/–)	27/6	25/–	40	40	27/–	+6d.	7 8 0
Falk Stadelmann	16/9	13/9	6	7	15/9	..	8 17 10
Ferranti Pref.	25/6	23/6	7	7	25/–	..	5 12 0
G.E.C.:							
Pref.	33/–	30/6	6½	6½	32/6	..	4 0 0
Ord.	81/–	77/–	20	20	82/6	+⅛	4 17 0
Greenwood & Batley ..	21/–	18/6	15	13	20/–	..	13 0 0
Hall Telephone (10/–) ..	13/–	10/–	15	10	12/6	..	8 0 0
Henley's (5/–)	21/6	19/6	20	20	20/–	..	5 0 0
4½% Pref.	21/6	20/–	4½	4½	21/3	..	4 4 8
Hopkinsons	41/6	37/6	15	15	42/–	+9d.	7 2 10
India-Rubber Pref. ..	21/6	19/6	5½	5½	21/3	..	5 3 6
Intl. Combustion	92/6	81/3	32½	30	92/6	..	6 13 4
J. Lucas	58/–	50/6	15	15	58/9	+⅛	5 2 0
Johnson & Phillips ..	48/3	43/–	15	15	42/6	..	7 1 2
Lancashire Dynamo ..	53/6	50/–	20	20	52/6	..	7 12 5
Laurence, Scott (5/–) ..	10/–	7/6	15	15	9/–	−6d.	8 6 8
London Elec. Wire ..	25/6	20/–	7½	7½	22/6	..	6 13 4
Mather & Platt	37/9	32/–	13½	10	38/9	..	5 3 3
Metropolitan Elec. Cable Pf.	22/–	21/3	5½	5½	21/3	..	5 3 6
Murex	84/6	75/–	20	20	82/6	..	4 7 0
Pye Deferred (5/–) ..	11/6	10/9	25	25	11/3	..	11 2 2
Revo (10/–)	21/3	18/9	17½	5	21/3	..	2 7 0
Reyrolle	52/6	47/9	12½	12½	52/6	+⅛	4 15 6
Siemens Ord.	20/9	17/–	7½	7½	20/–	+6d.	7 10 0
Strand Elec. (5/–) ..	2/–	1/–	4	2	2/–	..	5 0 0
S. Smith (1/–)	7/9	5/9	37½	50	6/3	..	8 0 0
Switchgear & Cowans (5/–)	9/–	7/3	10	15	8/9	..	8 11 6
Telegraph Condenser (10/–)	12/6	7/–	Nil	5	12/6	..	4 0 0
Telegraph Construction ..	39/–	34/6	10	10	40/–	..	5 0 0
Telephone Mfg. (5/–) ..	7/6	6/9	9	9	7/3	..	6 4 2
Tube Investments.. ..	92/6	89/–	23¾	23¾	89/6	+6d.	5 5 9
Vactric (5/–)	2/3	2/–	4	Nil	2/–	..	—
Vickers (10/–)	16/–	14/–	10	10	15/–	..	6 13 4
Ward & Goldstone (5/–) ..	19/9	12/6	20	20	16/6	..	5 19 9
Westinghouse Brake ..	42/6	39/6	17½	10	40/9	..	4 18 1
Walsall Conduits (4/–) ..	26/6	24/6	55	55	26/3	..	8 7 6
West, Allen (5/–)	4/3	3/6	7½	7½	3/9	..	10 0 0

* Dividends are paid free of Income Tax.

CONTRACT INFORMATION

Tenders Invited and Accepted. Schemes Promising Electrical Work.

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Coventry.—June 10th. Transport Committee. Conversion of existing DC lighting and power equipment in offices, garages and depot buildings to AC supply. Conditions, specification and form of tender from R. A. Fearnley, general manager and engineer, Harnall Lane East. Tenders to the chairman, Transport Committee, Transport Head Office, Harnall Lane East.

Hastings.—June 18th. Corporation. Boiler fuel for the period July 1st, 1941, to June 30th, 1942. (See this issue.)

Holmfirth.—May 31st. Electricity Department. Supply and delivery of one 200-kVA transformer. (See this issue.)

New Mills.—June 2nd. Electricity Department. 10-kV cables. (May 16th.)

Salford.—June 2nd. Electricity Department. Twelve-panel switchboard for 400-V, 15,000-kVA service. (May 16th).

South Africa.—DURBAN.—City Council. June 20th. Lightning arrestors, pole fuses, l.v. insulators, enamelled shades and sodium vapour lamps. Battery charging plant and electrical test bench.

July 4th. Five 15-kVA transformers.

PORT ELIZABETH.—City Council. July 24th. Cable, copper wire and house service cut-outs.

Walsall.—June 5th. Electric Supply Department. Three 500-kVA transformers. (May 16th.)

West Midlands.—June 4th. Joint Electricity Authority. Supply, delivery, erection, laying and testing of 33,000 V overhead steel tower transmission line and 33,000 V, 6,600 V and 400 V underground cable in connection with the Wolverhampton—Cannock—Chasetown power transmission line. (May 16th.)

Orders Placed

Barnsley.—Town Council. Accepted. Installation of wireless receiver, amplifier, and 110 pairs of headphones, for St. Helen Hospital (£297).—G.E.C.

Darlington. — Corporation. Accepted. Switchgear for a new switch-house (£4,479).—A. Reyrolle & Co.

London. — ST. MARYLEBONE. — Highways Committee. Accepted. Traffic signal repairs (£268).—Siemens & G.E.R. Signal Co.

Electricity Committee. Accepted. Maintenance of metering equipment at power station for 12 months (£289).—Landis & Gyr. Three air-cooled transformers (£1,575) and rewinding four transformers (£260 each).—British Electric Transformer Co. Storage battery repairs (£2,109).—Pritchett & Gold & E.P.S. Co.

Rawtenstall.—Electricity Committee. Accepted. Paper insulated cables for twelve months.—Henley's.

Stoke-on-Trent.—Mental Deficiency Committee. Accepted. Electrical installation at institution (£211).—N. G. Bailey & Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Antrim.—Works at a hospital, for the Governors; Munce & Kennedy, architects, 24, Arthur Street, Belfast.

Ashington.—Community feeding centres, East School and North School, for U.D.C.; J. W. Cuthbertson, clerk, Council Offices.

Barnet.—Improvements at the fire station, Underhill, for U.D.C.; surveyor, Ravenscroft House, Wood Street.

Beauchief.—Offices, etc., Ecclesall Road South and Hoober Road; T. W. Ward, Ltd., Albion Works, Savile Street, Sheffield.

Bristol.—Extensions (£2,327), St. Agnes Road central kitchen, for T.C.; borough engineer, 63, Queen Street.

Bromley.—Dining centre, Technical Institute, £1,100; Kent county architect.

Burslem.—Alterations Cobridge Hotel, Waterloo Road; Parkers (Burslem) Brewery. Ltd.

Carlinghow.—Lavatories, Upper Dock Ing Mills; C. M. Gaunt & Sons, rag merchants.

Chesterfield.—Alterations and additions Royal Hospital, Holywell Street; governors.

Feeding centre, off Chatsworth Road, £1,247; borough architect.

Coventry.—Completion of houses on Scots Lane Housing Estate, for Housing Committee; D. E. E. Gibson, city architect, 1a, Warwick Row.

Darlington. — Welfare club, Thompson Street, for the English Steel Corporation; R. Blackett & Sons, builders.

Droitwich.—Factory for cleansing materials at the old workhouse; G. F. Pineger, "Valrosa," Corbett Avenue.

Dundee. — New buildings, Corporation Farm (£14,000); city architect.

Felling-on-Tyne. — Community kitchens, Felling School, High School, and Bill Quay; U.D.C. surveyor, Council Offices, Felling, 10.

Gateshead.—Alterations to Gardener's Arms, Bensham Road; Isaac Tucker & Co., Ltd., Turk's Head Brewery.

Gosforth (Newcastle - on - Tyne).—Six buildings to be adapted as communal feeding centres. Estimated cost £2,400; C. Hyde, surveyor, Urban Council Offices.

Hampshire.—Repairs Knowle Mental Hospital; county architect, Winchester.

Hanley.—Rebuilding stores, 40-2, Marsh Street; T. A. Shaw.

Hebburn.—Conversion of St. Oswald's Infants' School, High Lane Row, into community feeding centre, for U.D.C.; acting surveyor, Council Offices.

Kent.—Staff accommodation, emergency hospitals (£7,740); Kent county architect.

Limerick. — Regional hospital, for the County Board of Health.

London (ST. PANCRAS).—Additional sleeping accommodation, Bartholomew Road Depot, for Emergency Committee; A. Powell Coke, town clerk, St. Pancras Town Hall, Euston Road, N.W.1.

Repairs and improvements, hospitals, etc., and drainage works (£200,000); L.C.C. Architect.

Longton (Staffs).—Additions, Tuscan works, Forrister Street; R. H. & S. L. Plant, Ltd.

Macclesfield. — Structural alterations, Longacre Street, and equipment, for British Restaurant, for T.C.; A. Bond, town clerk.

Manchester.—Boiler house to Brewery, Claremont Road, Rusholme, for Whitbread & Co., Ltd.; F. T. Harrison, architect, 27, Britannia Street, London, W.C.1.

Reconstruction of portion of brewery, Briddon Street, for Boddington's Strangeways Brewery; G. Westcott & Son, 31, Byrom Street, Deansgate.

Mayo.—Erection of labourers' cottages, for County Board of Health and Public Assistance.

Morley.—Alterations to feeding centres at Mill Lane, Churwell, and the Central Library, for T.C.; F. Turner, borough surveyor, Town Hall.

Neston.—Building for A.R.P. accommodation (£1,000), adjacent to Town Hall, for Cheshire C.C.; F. A. Browne, county architect, The Castle, Chester.

Ogmore.—Works at Ogmore Vale police station, for Glamorgan Quarter Sessions and C.C.; county architect, Glamorgan County Hall, Cardiff.

Peterborough.—Repairs to property in Queen's Walk, for T.C.; city engineer's office.

Seaham Harbour (Co. Durham).—A communal feeding centre, for Urban Council; J. B. Abbey, surveyor, U.D.C. Offices.

South Kirkby.—Firemen's houses (10). Moorthorpe Fire Station, for Hemsworth R.D.C. (£7,000); Gibson Bros., builders, Upton, Pontefract.

South Shields.—More communal feeding centres; M. G. Richardson, borough engineer, Town Hall.

Stockton - on - Tees. — Canteen for Ashmore, Benson, Pease & Co., Ltd.

Central kitchen (£2,297), Bath Lane School, for T.C.; A. S. Knolles, borough engineer, Victoria Buildings.

Swansea.—Temporary maternity hospital accommodation; borough architect.

Tunstall.—Alterations Rollers Arms public house, Chapel Street; Parkers (Burslem) Brewery, Ltd.

Uckfield.—Cleansing stations at Crowborough, Mayfield and Wadhurst, for U.D.C.; J. H. Thomas, clerk, Beacon Road, Crowborough.

Wallsend - on - Tyne. —Communal feeding centres at Allen Memorial Church, St. John's Church, and the Western and Central Schools; J. H. James, builder, East Farm.

Watford.—Crematorium, for T.C.; borough surveyor, 14, High Street.

Wellingborough. — Temporary isolation pavilions; Eastern Northants Joint Hospital Board.

Winchester.—Remand home, Ashbourne Lodge; Hampshire county architect.

Wirral.—Auxiliary fire station, and adaptation of a building for auxiliary fire station, for U.D.C.; surveyor, Council Offices, Heswall.

York.—Pump house in connection with extensions to sewage works; C. J. Minter, city engineer.

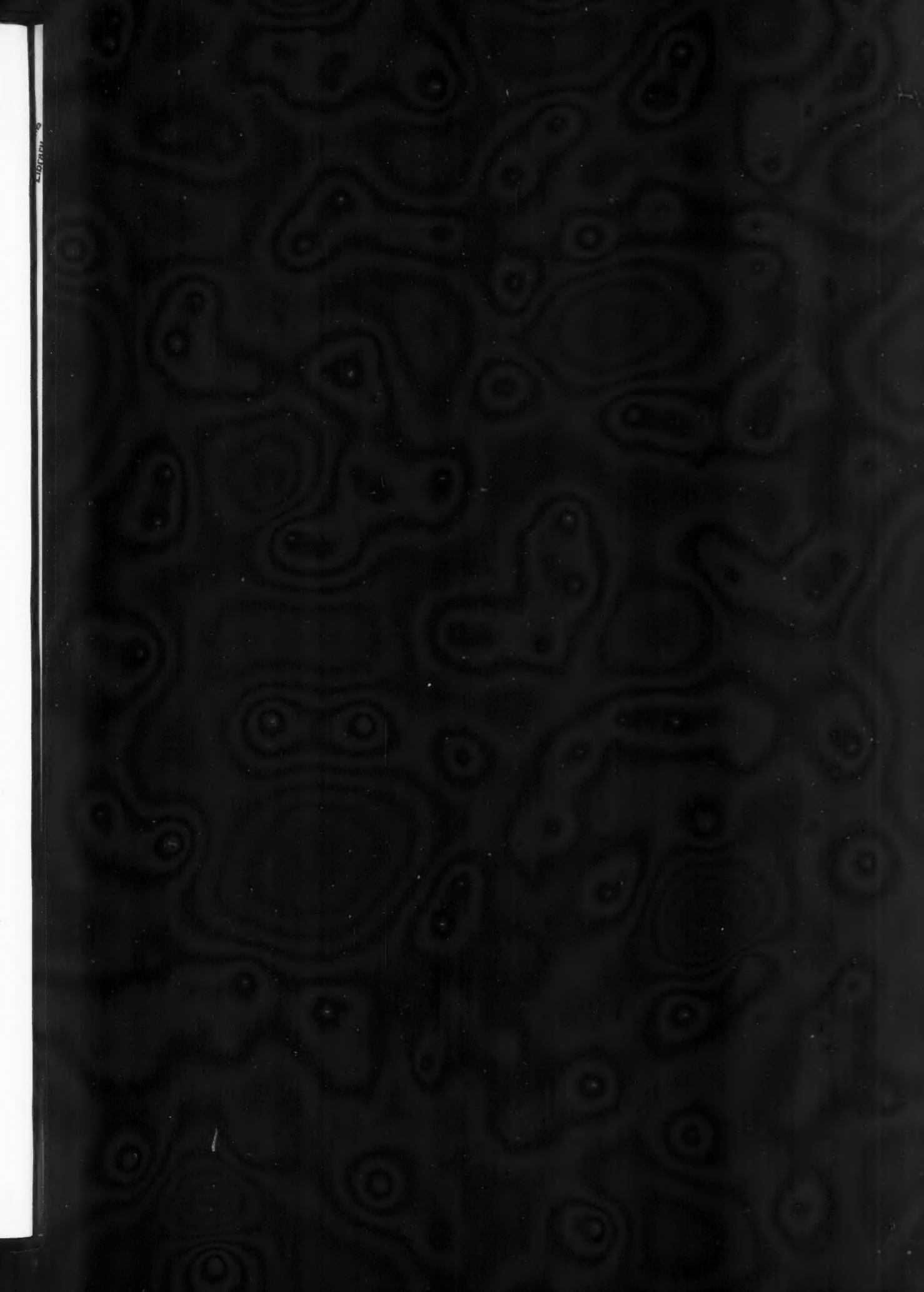
Office, Cemetery Road; York Co-operative Society, Ltd.

Fatality

A VERDICT of "Accidental death" was recorded by the East Devon Coroner at an inquest at Exmouth on Sidney Henry Barlow, aged 48, maintenance engineer in the employment of the Exe Valley Electricity Co. Herbert Henry Leach said he was assisting Barlow to put right a breakdown at a sub-station when he heard a hissing sound as a fuse was being fixed and saw a spurt of flame. Barlow, who had no ladder, but had climbed up on a transformer, fell to the ground. Ronald B. Allison, the company's distribution manager, stated that Barlow was quite capable of dealing with the job he tackled, and which he apparently undertook himself because he was unable to get outside assistance owing to a telephone breakdown.

Dr. R. Gray, of Exmouth Hospital, gave evidence that Barlow died a few hours after admission from shock owing to extensive burns on the hands and back through having come into contact with a live wire.

The Coroner said he was satisfied that there was no negligence on anyone's part. He thought Barlow acted in good faith in what he tried to do, but a defect had rendered a switch ineffective and led to the accident.

Another Fire-watching Dispute

According to the *Western Mail* men in the employ of the Cardiff Corporation Electricity Department who refused to do fire-watching are to be prosecuted. Powers to do this were recently given to Mr. E. Jones, the city electrical engineer, by the Electricity Committee, when it was reported that several employees refused to do any fire-watching.